

# MODERN PLASTICS

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## NEXT MONTH

There is promise that certain mold costs may be reduced from one half to two thirds through the new cast beryllium copper molds made exclusively by The Gorham Company, bronze and silverware manufacturers. It effects its greatest savings where carving, repoussé and lettering are required on the plastic casting. The story of the process, its advantages and its limitations, will appear in our November issue together with a case history and comparative costs of molding the new Gorham silverware box cover from a beryllium copper mold.

Bonwit Teller has found a brand new use for cast resin sheets and we have been promised permission to reveal the story in our November issue.

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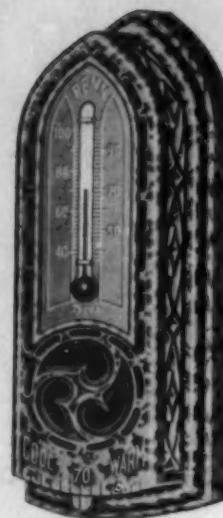
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# Plastics by RICHARDSON



## PENN MODERN TEMTROL

The first heat regulator especially designed for low mounting . . . as low as desired . . . to assure true comfort in the four foot zone. When mounted as recommended, it maintains a constant temperature without changes in the setting, regardless of outside weather conditions. A truly modern control for modern comfort.



## PENN GOTHIC TEMTROL

A beautifully designed instrument that harmonizes with practically all interior arrangements, in three standard color combinations—warm walnut brown, black and ivory. It prevents costly overheating and uncomfortable underheating, and can be mounted as low as table level to maintain truly automatic comfort.

## Richardson Moldings Improve Design and Modernize

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#### INSUOK . . .

(A superior laminated phenolic product) in sheets, rods, tubes and fabricated parts in several grades for different applications.

#### EBROK . . .

An acid resisting bituminous plastic developed by Richardson research for specific requirements. . . . Used in molding more than 50 million battery containers. A record of achievement in the plastic art never equalled.

#### RUBTEX . . .

Molded hard rubber for all purposes.

. . . . A quartet of worthy products produced by the largest organization devoted exclusively to the plastics arts in the United States with three modern plants at strategic locations.

Until recently all room thermostats were made of stamped metal and were large, cumbersome, ugly gadgets.

The Penn Electric Switch Company set out to design smaller, more attractive room thermostats . . . naturally they turned to plastics and, with the cooperation of Richardson designers, created new thermostats of extraordinary beauty, design and utility . . . Many production operations are eliminated because inserts, mountings and final finish are produced right in the moldings operations . . . Due to the superior insulating properties of INSUOK materials, these new creations are more accurate, small and unobtrusive, and the permanent, attractive colors harmonize perfectly in all surroundings . . .

When developing new products or modernizing old ones, we invite you to take advantage of our facilities.

As custom molders of Plaskon, Beetle, Durez, Bakelite, Resinox, Indur, Tenite, and all forms of synthetic resin plastics, the vast resources of our research Laboratories, Design and Engineering Departments are at your command.

*The* RICHARDSON COMPANY

Melrose Park, Ill.

New Brunswick, N. J.

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# MODERN PLASTICS

BRESKIN AND CHARLTON PUBLISHING CORP.

## MOLDING THE TOLEDO SCALE CASING

by *N. S. Stoddard*

PLASTICS DEPARTMENT, GENERAL ELECTRIC CO.

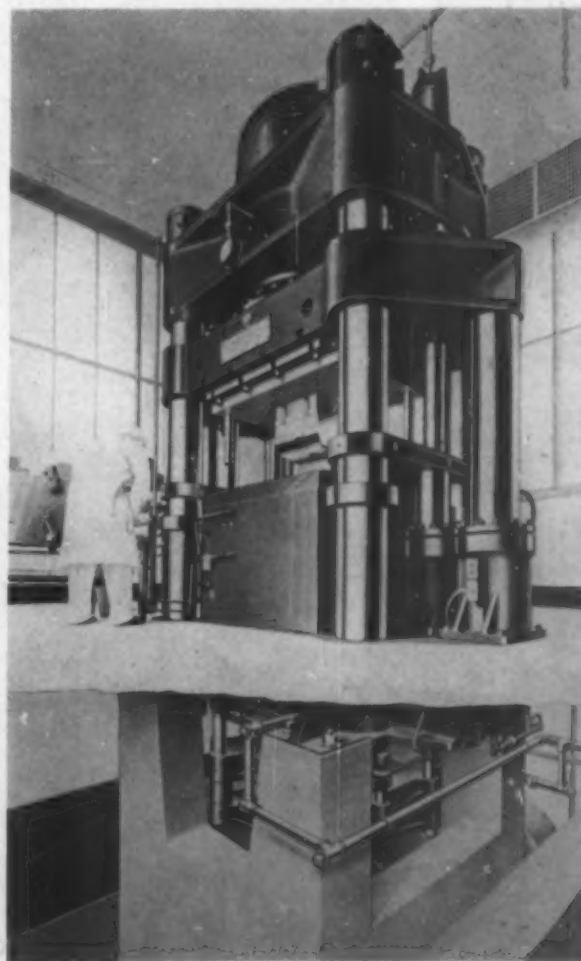
**P**ERHAPS one of the most outstanding achievements in collaborated research, design and development is revealed in the retailer's scale announced last month by the Toledo Scale Company, Toledo, Ohio, and which was described in an article written by H. D. Bennett, president, Toledo Scale Company, in the September issue of MODERN PLASTICS.

As a part of this collaborated activity, the Plastics Department, General Electric Company, spent many months of intensive study, careful planning and plastics research in developing the facilities and molding technique required to produce the molded white Plaskon casing for the Toledo scale.

Up to the time of the manufacturing of this casing, experience was lacking for molding such a large piece; therefore, every precaution was exercised so that no possible trouble, however minute, might interfere with the success of the molding. For example, the press manufactured by the French Oil Mill Machinery Company, Piqua, Ohio, under the supervision of G. E. engineers was so built that it would have a maximum of flexibility. This is attested by the fact that there are nine separate hydraulic cylinders on the press although there is only one main pressing cylinder. The other auxiliary cylinders are used to give the desired flexibility. In addition, the valve unit design is unique and is another example where careful planning was necessary in order to assure complete control.

Some of the nine cylinders, already mentioned, are paired and connected together with the result that only six separate controls are needed. A large solid steel forging was used for the valve block and all of the operat-

ing valves were machined from it. Since each cylinder, or each pair of cylinders, must be connected either to the 1500 lb. pressure line or the 3000 lb. line or to the exhaust line, eighteen separate valve stems are required to give complete control of these several cylinders.

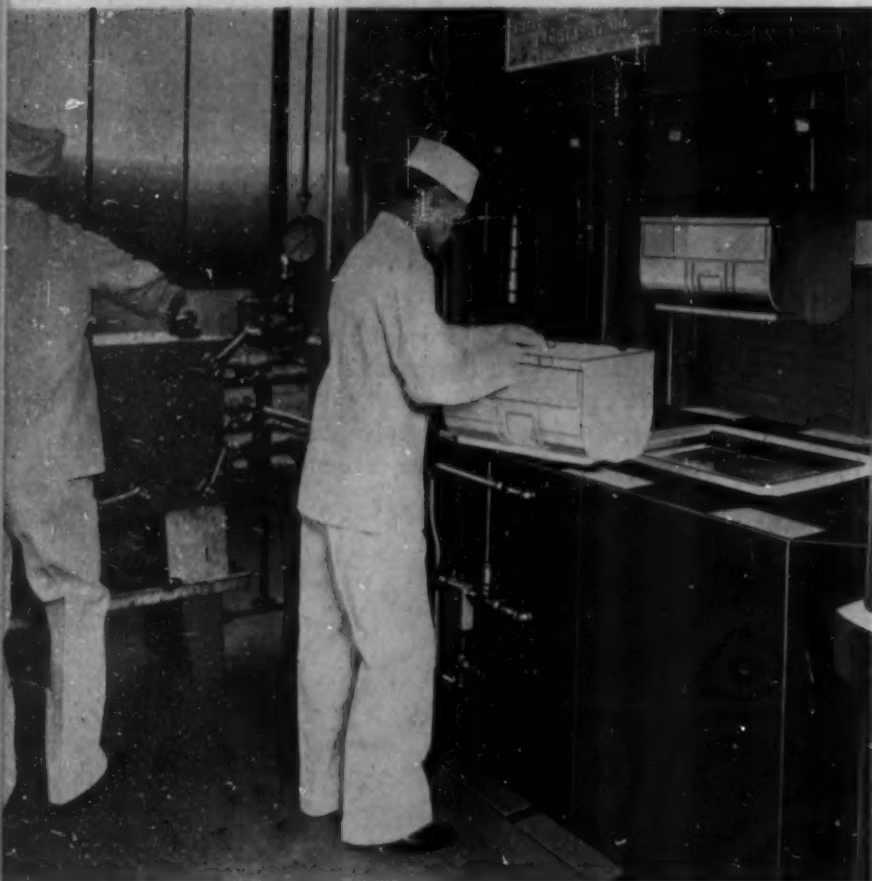


Hydraulic press for molding Toledo Scale Company's new Plaskon casing. Side view with floor cut away to show base and full height of press



The entire press unit weighs 89,000 lb. and is nearly two stories high. This weight, however, does not include any of the valves or auxiliary equipment. Developing a total pressure of 1500 tons, this large-unit molding equipment opens an entirely new field for plastics—a field for large units that heretofore had to be made from other materials because of the lack of large molding facilities. So much for the press. Let us now turn to the making of the molds which is the second important step in the production of the Toledo scale casing.

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2 Toledo Scale Company's scale casing being removed from hydraulic molding press. Multiple valve control block and operator at left

3 Another view from observation room in G. E. Fort Wayne Works, showing scale casing being removed from hydraulic molding press in air conditioned room

4 Plunger and stripper-plate section assembly for scale-casing mold. Approximately one twenty-fourth actual size is illustrated

5 A close view of plunger section of the huge mold being machined

6 Multiple valve block where six separate controls operate the nine cylinders of the 1500-ton hydraulic press used in molding. Approximately one-twentieth actual size is illustrated

7 Section of filter system used in cleaning air in press room where scale casings are molded

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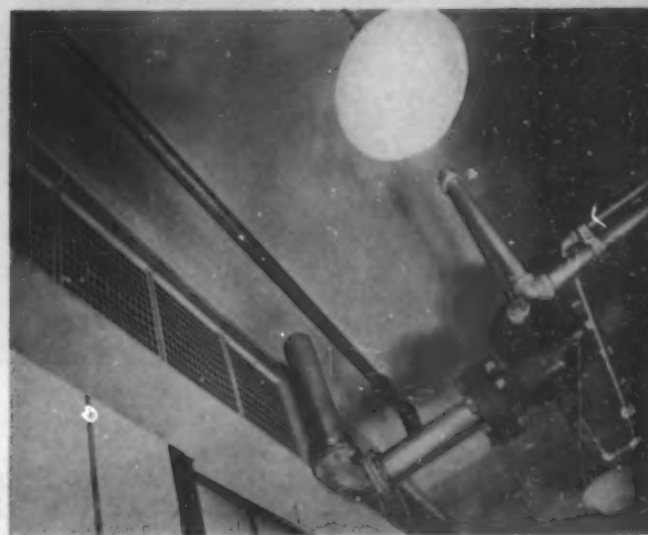




If it were not for engineering, craftsmanship and knowledge gained from research, the success of molding the casing could have turned into a total failure at almost any stage during the machining of the molds. The mold design is of the semi-positive type and is made up of four major parts; namely, the plunger, the "U" shaped part and the two end plates. (To indicate the enormous size of the finished mold, the overall height when closed is 42 in. and the longest dimension is 60 in. The total weight is approximately seven tons.) The "U" shaped part and the two end plates comprise the cavity of the mold and were so designed to favor machining operations and to minimize tool expense. These sections have a hardened and highly polished cavity surface and are held together by a housing consisting of three rings of 6 in. steel, shrunk around the outside and made strong enough to stand the maximum pressure of 1500 tons. Special grades of highest quality steel were used for making all the various parts of the mold.

Perhaps one of the most anxious moments in the manufacture of the mold was when the hardening took place. Machined to size, the parts were shipped from the G. E. machine shop to the Lindbergh Heat Treating Plant, Chicago, for carburizing and heat treating. Special methods of handling during the treatment had to be developed to avoid distortion, cracking or nicking of the parts and particular care was taken in the hardening of the "U" shaped part so that it would contract rather than expand during the cooling operation. It is obvious that expansion would have rendered the "U" part useless. As there was only a slight contraction rather than an expansion, it was a simple matter to grind the "U" part down to its accurate dimensions without any damaging effect on the hardened surface.

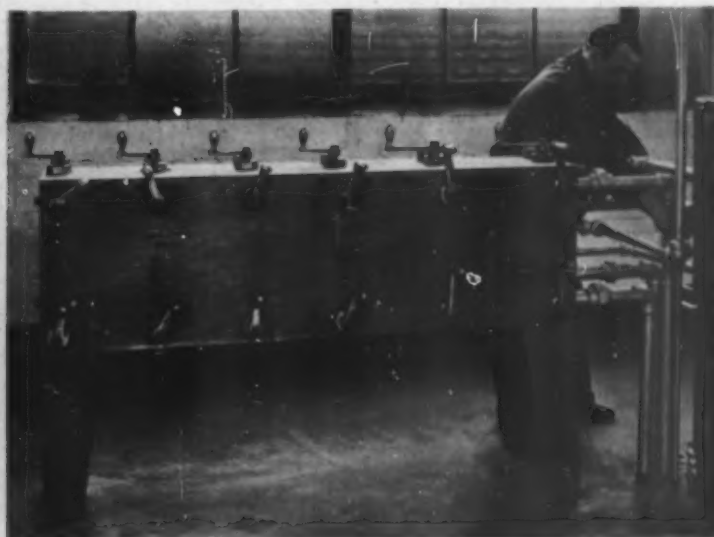
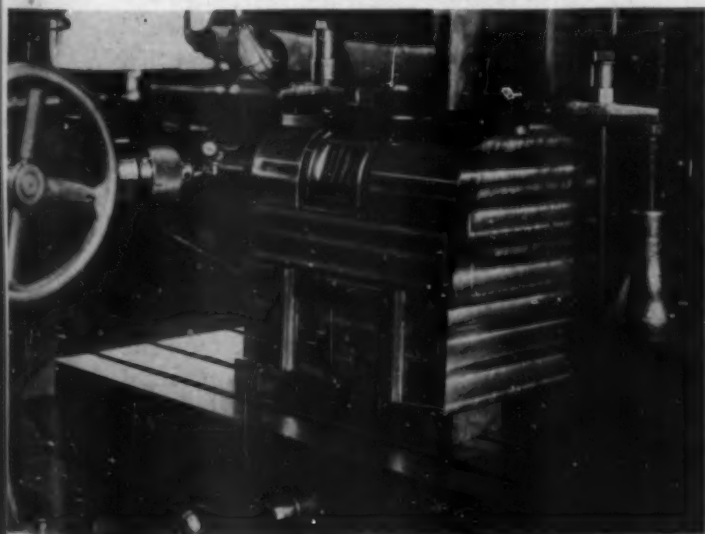
The third problem which was faced in the development of the Toledo Scale casing, was a method of keeping the pure white Plaskon molding compounds free from impurities—one speck of dirt would ruin a casing. To assure absolute cleanliness, two rooms were built:



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one in which the press was installed and the other for storage, weighing, etc., of the Plaskon compounds. These rooms, of course, are connected but are carefully sealed from the out-of-doors and from other parts of the factory. To assure adequate fresh air and to guard against any circulation of dirt or dust, an air conditioning or air filter system was installed in these two rooms. This system provides an abundant supply of clean filtered air free from traces of dust or other contaminations and in sufficient quantities to carry off the waste heat from the press. Both rooms are air tight except for the air supply duct, mounted near the ceiling on one side of each room and the air discharge duct, mounted in the windows near the ceiling on the other side of each room. The discharge ducts are arranged to restrict the flow of the air, thus building up a slight air pressure in the room. This pressure insures against the infiltration of unfiltered air through the door when opened or through any possible cracks. The large space-opening of the air supply ducts reduces the (Continued on page 56)

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All photos, courtesy, Formica Insulation Co.

## Laminations for Domestic Interiors

by Ruth Lampland

*The home builder with a flair for Modern finds his grandest expression through flat mass and color to which laminated plastics lend themselves admirably. Small houses and pretentious residences share their advantages as pictured here. Architects and designers should find this story a most convincing answer to their questions: "Are laminated plastics ready for the housing market?" and "Where are some examples of their recent use?"*

LAMINATED plastics seem to be the most recent "accent on youth" added to the list of materials currently favored in home decoration. Attention was recently drawn to their popularity behind the scenes by a new cocktail room and bar made entirely of materials treated by, or made of, synthetic resins. In a beautiful residence in Montclair, New Jersey, this bar was designed and executed entirely for fun, by a business executive and his wife, neither of whom laid any claim to professional skill in the fields of decoration or architecture. The bar and cocktail room are modern in feeling and design. The color scheme is deep rose, royal blue, and silver, with accents of black. Walls are silver, painted with a synthetic-resin wall paint. Drapery valances and the upholstery valances are of deep rose fabric treated with synthetic resin so as to be impervious to water, acid and alcohol stains, and cigarette burns. The bar itself, covered with this same fabric in royal blue, has a dull black top and base of laminated resin applied to its wooden frame. The back bar counter is also of laminated plastic similarly applied. This, so far as we know, is the first time such materials have been applied to the decoration of an entire room in a private residence by non-professional people, "just for fun." But the movement on foot all through the country is certainly indicated by the fact that amateurs feel so confident of these new materials that they can take hold of them and apply them without professional help or fear of structural problems.

Professional designers, decorators and architects are,

of course, the major factors in this tremendous growth of popularity. Those who are alive to the possibilities of these new synthetic resins—particularly the laminated resins, because of their adaptability for covering large surfaces—have been applying them to domestic interiors throughout the country.

In New York, such prominent architects as Schulze and Weaver, Morris and O'Connor, and Emery Roth; such well-known industrial designers as Donald Deskey; and decorators like Nat and Irving Eastman; have been among those applying laminated plastics to the decoration of home interiors with increasing success. In Providence, Philip Franklin Eddy; in Tampa, Frank Frimmer; in Cincinnati, Korb and Korb and Ward Franklin; in Chicago, David Adler and I. G. Stern; in Birmingham, Jack B. Smith; in Miami Beach, Robert Law Weed—are a few of the architects prominent in the use of these new materials in various parts of the country. The results of their efforts are outstanding.

Increased business is being felt by the manufacturers of laminated plastics as a result. One corporation finds that the proportion of its output being consumed by architectural and decorative uses has recently risen to a high point of 40 per cent. This is understandable when one realizes the greater amount of material needed to wainscot one wall, than to make two hundred small smoking accessories, or fifty table tops.

What are the reasons for the great growth in popularity of laminated plastics for domestic interior decoration? One reason lies in the material itself. It is





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- 1 Lounge-bar in the home of Allan Brown, advertising manager of the Bakelite Corp. Bar and counter tops are of laminated phenolic, satin black, trimmed with decorative metallic inlays. Table tops and smoking stand are laminated, of course
- 2 Bath in Don Gardner's Cincinnati home, paneled in Formica with metal and colored inlays
- 3 Satin-finish dark red laminated with dull black bands inlaid with silver in the home of W. R. Mahoney, Pawtucket, R. I.
- 4 Bathroom wall display at the "Cincinnati Home Show of 1935." Ivory Formica with blue and gold colored metal inlay
- 5 Laminated plastics were used for walls and working surfaces in this kitchen in the "House of Tomorrow" (by Eastman Decorators, Inc.) Miami
- 6 Entrance door in this "House of Tomorrow" is of Formica, as is the paneling of wide alternating bands of color in the dining room
- 7 Laminated bar in the Eastman "House of Tomorrow" showing decorative possibilities of alternating bands of color and metal
- 8 Inlaid Formica wainscot in the breakfast room of the "Stran Steel Home" built by Korb & Korb, Cincinnati

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particularly suited to the decoration of home walls, ceilings, tables, sink splashboards, chairs and screens because of its lustrous hard finish which is easy to keep clean with soap and water, yet almost impossible to scratch or mar. It is available in as many colors as a decorator or designer would wish to have for a given color scheme. Its design possibilities are manifold, because of the ease with which it is given permanent inlays of metals or of contrasting colors of laminated plastics themselves, and its texture is pleasing to the eye over long periods of time. Then, of course, it is serviceable—insensitive to alcohol, acids, strong soap and water, and burns.

Another reason lies in the change in domestic architecture which has taken place within the last five years. We like these materials which supply "accents on youth" because we live more naturally and more youthfully than ever before. We enjoy the home accents of life in a much more natural manner—we entertain informally, and are more likely to serve a large group with cocktails, canapes and small snacks in our living rooms than we are to entertain with stiff formality in a large dining room. We enjoy our (Continued on page 54)



**M**ANAGING a metropolitan housing project the size of London Terrace, with its sixteen hundred odd apartments and more than three thousand tenants, is no small undertaking. Aside from the problems of rentals and collections, upkeep and repairs are major factors which influence, if they do not control, net profits on the investment. Law suits brought about through defective or unsuitable equipment are not only expensive and annoying to tenant and landlord alike, but they bring a cloud of unwelcome publicity that is not in the least helpful in obtaining tenants.

"When London Terrace was designed and built in 1929, it represented the utmost in building design and construction of the day," says William J. Demorest, vice-president, W. A. White & Sons—Managing Agents.

"Baths were accorded the relative importance they maintain in every American home. Fixtures were chosen with care that they might render satisfactory service over a long period of time. Faucet handles were of porcelain because it was clean and sanitary and because porcelain was the approved material for the purpose at that time. No better material was known.

"Porcelain, however, is brittle. Tenants, even the best ones, are careless at times. Turning the porcelain handle on the faucet too tightly sometimes caused it to crack. With more than ten thousand faucets, daily inspection was impossible with the result that sooner or later one of these faucet handles was bound to split, leaving a sharp, glass-like edge. Many times this happened causing physical damage (Continued on page 49)





## IMPACT TESTER FOR MOLDED INSULATING MATERIALS\*

by *I. L. Hopkins*

BELL TELEPHONE LABORATORIES

**A**LL of the 17,000,000 telephones in daily use in the Bell System are made in part of molded insulating materials. The importance of such materials to the telephone is evident when but one of their many uses is considered—namely, the casing of the handset and the mouthpiece and receiver of the desk type telephone. Some breakage of such parts is inevitable but losses have been greatly reduced by the use of compounds offering high resistance to fracture. The toughness of these products is therefore a very important characteristic and in studying them it has been found necessary to devise apparatus not only to determine the resistance to impact of the finished parts but also that of the material itself.

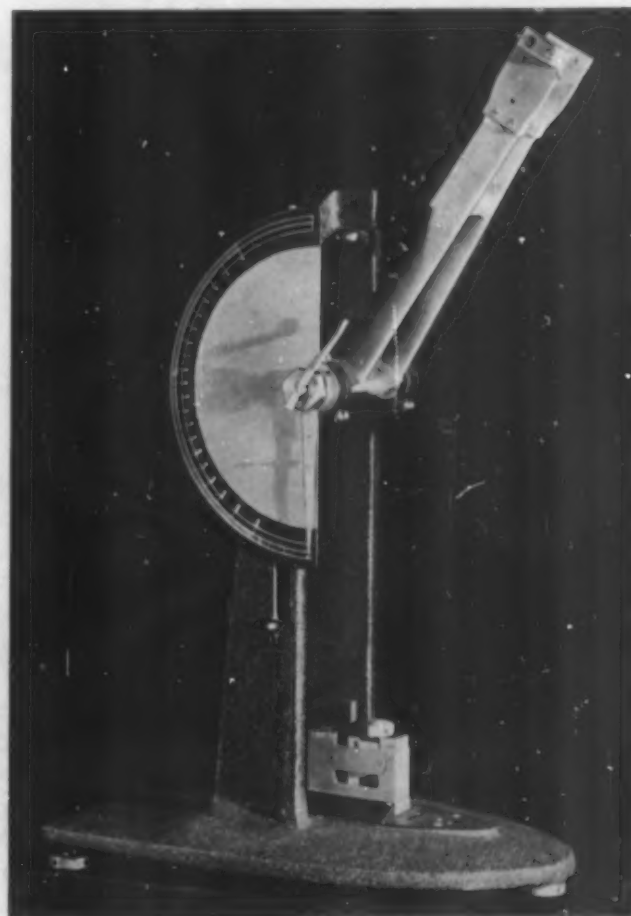
Investigations carried out years ago by others to develop methods of testing impact strength of materials have shown that the work required to break a test specimen is a reliable quantitative measure of the resistance to service fracture and that the use of a swinging pendulum to cause the fracture is a simple and effective means of making the measurement. In practice the specimen is held in the path of the pendulum at its lowest point and broken by a single blow when the pendulum falls from a known height as it is released from a catch which holds it in an elevated position. The energy used to break the specimen is computed by measuring the difference between the height from which the pendulum starts and the height to which it swings after the break, with suitable correction for windage and friction losses.

Machines constructed on this principle have been used for many years in testing metals and their adaptation to the study of molded insulating materials therefore suggested itself when an investigation of the impact strength of such products was undertaken some years ago by the Laboratories. As this method of test is to a certain extent arbitrary, the problem of applying it to insulating materials was merely one of determining a specimen suitable for these materials and developing a machine of the sensitivity required. The essential problem which had to be solved for the new machine was to make a pendulum of the requisite length sufficiently light and rigid to deliver a blow of hundreds of pounds and yet measure accurately the impact value of specimens requiring only a fraction of a foot-pound to break them. The difficulty was met by making the shaft of the pendulum of thin aluminum lattice work reenforced with crossbracing. The capacity of this machine, 2.26 foot-pounds, was the smallest obtainable at the time.

The fundamental work of classifying materials according to their impact strength was done with this machine and requirements were written by the Laboratories for materials in which impact strength is a critical quality. The machine is well suited for the general testing of materials of the types listed below which have strengths lying in the following ranges:

Hard rubber.....	0.12 to 0.35 ft. lbs.
Wood flour filled phenol plastic....	0.1 to 0.15 ft. lbs.
Cotton flock filled phenol plastic...	0.2 to 0.3 ft. lbs.
Phenol fibre—edgewise.....	0.2 to 0.3 ft. lbs.
Phenol fibre—flatwise.....	1.0 to 1.2 ft. lbs.
Phenol fabric.....	1.2 to 1.9 ft. lbs.

Experience showed that some changes in construction, particularly to increase the permanence and rigidity of the pendulum and of other parts in order to insure accurate coaxiality of the pendulum axis, scale and pointer, were needed. A new model shown in the illustration was therefore built which incorporated these and other mechanical (Continued on page 47)



\* Reprinted with permission from Bell Laboratories Record



Spectacle frame and caps with outside threads are molded of cellulose acetate by extrusion method as are the two pieces in lower right corner, the bottle caps (left corner) and the fountain

pen. The top of the pen cap is styrol to resist ink and extends down inside to cover the pen point when closed. The four collapsible tube caps with "gates" still attached are made of styrol

## PLASTICS IN GERMANY

*by R. E. Dodd*

GENERAL PLASTICS, INC.

**I**N Germany the plastics industry has reached a high state of development and many materials and processes used in other countries have apparently originated there. The full range of plastic materials is manufactured and the shortage of natural raw materials has caused the chemical industry to look for all sorts of synthetic replacements. This has proved a great stimulus to the chemical industry and has had a very definite effect on increasing the use of plastic materials. On the other hand, money is quite scarce in Germany and consequently the market for any particular item is rather limited so that orders are quite small and production is low. Possibly this has been the chief factor in stimulating the development of polystyrol and cellulose acetate molding by injection, because with this method, initial tool costs are very low and production is high. At any rate this method and these

materials are in wide-spread use and account for a good share of the plastics tonnage in Germany.

Spectacle frames, fountain pens, tube caps, bottle caps, insulation parts, battery cells and separators are made in this way. The machines and molds used in manufacturing them are of efficient design, and quite intricate parts are molded with comparative ease. Small delicate inserts are molded in without danger of breaking or being carried out of position by the flow of material. Small holes formed by slender pins are easily included. Complicated insulation spools with very thin vanes are made with comparative ease whereas their production from other materials by the pressure method of molding would surely be impossible. Very little finishing is required on completed parts as the mold finish is excellent; fins are paper thin; and the on-cast is designed for easy trimming. To see forty compara-



This inkwell, molded of styrol (unaffected by ink) is leak-proof and practical. Lighter than glass and more durable, it makes a satisfactory package both for display in shops and for use in homes

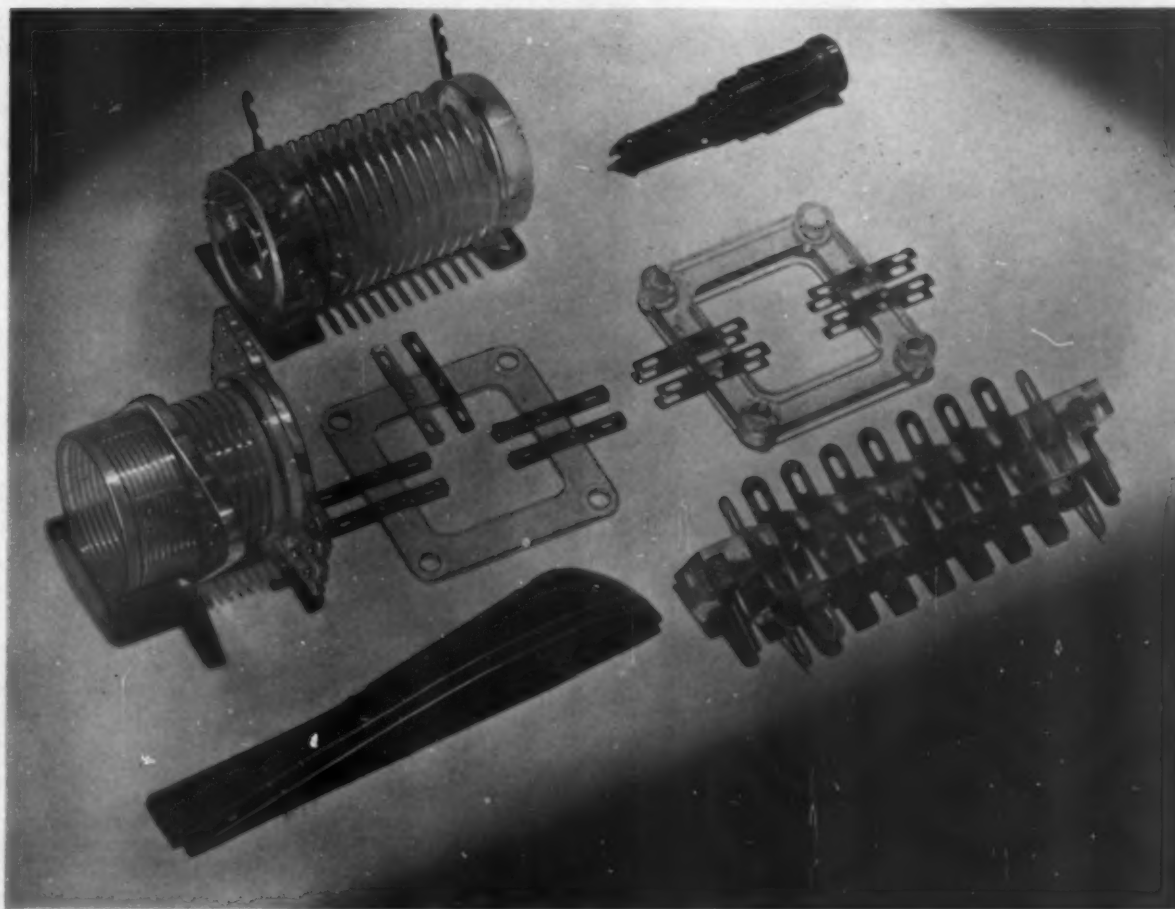


tively small injection machines turning out a large production of a great variety of parts from acetate and polystyrol with a minimum of labor on the part of the operators, makes one feel that the molding of plastics in Germany has indeed reached a high state of efficiency.

While this type of molding seems particularly outstanding in Germany, phenolic and urea materials have by no means been neglected. Urea moldings seem to be of particularly high quality and excellent finish, probably due to the fact that molds are for the most part of the positive type. Many radio cabinets are produced and it is estimated that sixty per cent of all the radio cabinets used in Germany are molded. They are quite large in size but even so require a cure of only four to five minutes and sell for \$1.80 to \$3.60, depending upon the size of the cabinet.

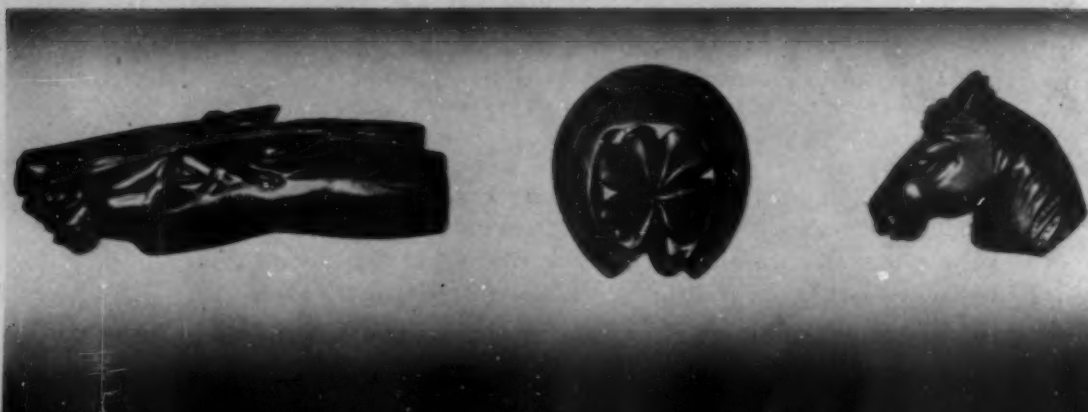
Great attention is given to design, which must be fundamental rather than in the sense of decorative. One large concern has a designer working constantly on new items—particularly proprietary urea articles—and some very beautiful objects have resulted.

It has been necessary for the large material concerns to do most of the pioneering, especially where new types of material are involved. They have not hesitated to do this and in some instances have actually done a good portion of the molding themselves in order to get things started. One interesting example of this is a complete line of bathroom fixtures including tumblers, soap dishes and tooth brush holders, all with molded brackets for mounting on a panel. The fixtures and brackets are in white urea (*Continued on page 57*)



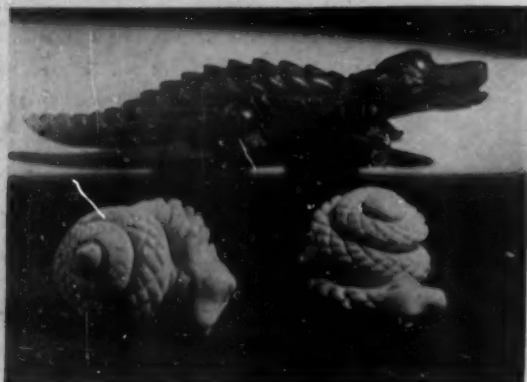
All these transparent pieces are of styrol in which metal inserts become integral parts by the extrusion method. Moldings are entirely transparent and possess good electrical properties. The piece in lower left corner is the wing of a toy aeroplane molded of styrol because of low specific gravity and strength. The fountain pen tip is of cellulose acetate

These clips of Catalin, to ornament the tweeds and homespuns of today's vogue, are obviously carved by master craftsmen



## Appropriate Application

by E. J. Lougee



Attention to fine details in both carving and design is given this alligator of translucent Catalin. Serpents, coiled or in action, are also used as clips.



**I**N contradiction to an impression which you have all heard expressed frequently—that plastics have cheapened themselves by their association with tawdry and inconsequential merchandise displayed in low price stores, we present these smart and practical dress ornaments and accessories carved from cast resins for women's sportswear by the United-Carr Fastener Corporation to meet the increasing vogue of tweeds.

We think they offer pretty good evidence that the distinction between cheapness and elegance is much more a matter of craftsmanship and intelligent handling than it is of materials themselves. At the risk of being elemental, I would like to point out that long stemmed champagnes at Tiffany's have at least one point in common with wine goblets in the five-and-ten-cent stores—they are both made of glass. Common clay (cheap as dirt) may be formed into marbles by one group of craftsmen, while another group will fashion the same material into beautiful pottery which demands a good price in a receptive market.

And so it is with cast resins. These materials of rich deep colorings, in themselves beautiful, may be enhanced or profaned at the hands of workmen who convert them into consumer goods.

In studying the possible market for leather buttons, the United-Carr Fastener Corporation was struck with the need, particularly for sportswear and knitted clothes, of more colorful, original and fitting buttons. Until recently, buttons used were not in keeping with the individual character of the sports clothes made in

The deep accurate carving on these Catalin bracelets makes them look valuable and expensive. They will have definite appeal to shoppers who know their jewelry



either the American or English markets. Aware of the tremendous rightness of leather buttons for this type of dress, the company improved and created new button styles which are outstanding in this field today.

Naturally, such intensive interest in ornamental clothing devices led to an investigation of other materials to supplement leather. Having had experience in fabricating cast resins for bag tops in another branch of their factory, it was logical that they should turn to these materials whose gay colors are in splendid harmony with outdoor clothes. It is logical, too, that outdoor motifs should be prominent in their designs.

There is a "horsey" group for riders and followers of the turf which includes several carvings of horses' heads, and two horseshoe designs surrounding a four leaf clover. The horses in action—nose and nose in a race with muscles flexed, eyes tense—make them doubly interesting and attractive. They are carved from lustrous black or from a real chestnut brown translucent material. Fine consideration is given to details in all the carvings, and colors have been chosen and combined carefully to give natural effects.

Alligators appear upon bracelets, or by themselves with clips to hold them firmly in place upon hat or dress. Frogs, of delicate green, are skillfully carved with eyes that fairly pop out at you as you watch them. Serpents, well coiled or in repose, are faithfully reproduced for those who prefer them.

Perhaps the most natural reproductions in the various groups are the field daisies which are made with both

single and double rows of petals. Single daisies are carved from a solid piece of the material, while the double daisies are made up of three disc-like sections screwed together from the back, the center disc forming the center of the flower. These are made with ivory petals and yellow centers; yellow petals with black centers; and (putting one over on nature) some have green petals with yellow centers.

Most of the carvings are made in matching sets which include a bracelet, one or two clips and smaller pieces to be used as buttons. Some of the bracelets are introducing a new feature with double hinged tips which allow them to be opened sufficiently to slip over any wrist without effort, yet cannot slip off without being intentionally bent back.

At a preview held recently at the Waldorf-Astoria, those wise in the trends of fashion predicted a grand success for United-Carr Fastener Corporation novelties.

The cast resins used in fabricating the items shown on this page are Catalin, manufactured by the American Catalin Corporation, New York.



This daisy clip is made in three sections, individually carved, and fastened together with a screw in the center

Stylists are most enthusiastic about these Catalin daisies—as clips, earrings, bracelets and buttons. The daisies on the bracelets are attached by tiny screws put through from the back and countersunk so they do not come in contact with the wrist

# Three Monographs on Color

THE RESEARCH LABORATORIES OF THE  
INTERNATIONAL PRINTING INK COMPANY

**A** BOOK on color usually presupposes a theory on color. And a theory on color is usually a backward approach to a defense of the writer's position rather than a logical demonstration of newly discovered facts. Color is an amazing subject, so rife with implausibilities, conjectures and guesses on its application, the true expert is prone to admit he knows less and less the more and more he delves into the subject. The amateur expert—and many of them are widely accepted as "authorities"—greet the length, width and breadth of the subject as something he can easily disclose in discourse and fully impart to the ignorant.

Within the last month the writer was given a demonstration of all the values of color by a knowing gentleman who had been unfortunate enough to win a well publicized prize for a picture he had painted. "Color is fundamentally simple," he began. "In my training and in my later work I never cared for math or physics or chemistry. I don't like them and there's no use in letting them clog up color. I discarded them and got into light and its angles immediately." Why continue after such an opening contradiction?

Our approach to color presentations is always critical. Time and all too insufficient study have proved the subject too vast for any but a critical attitude. If that attitude is appeased (and it has been erroneously appeased), it is only natural that the reception be one of sincere enthusiasm.

In the case of "Three Monographs on Color" ((1) Color as Chemistry, (2) Color as Light, (3) Color in Use) there are no mixed emotions. The books are exactly what the doctor ordered and wholly to the patient's liking. The authors—some of the really eminent scientific authorities—have no ax to grind, no

We've been told repeatedly that color influences retail sales of various commodities to a rather remarkable degree. Those who have investigated find this to be a fact beyond doubt. Fountain pens, since they cast off their rigid adherence to black, have increased their demand by a very high per cent. Automobiles, if there were no choice of colors, would find stubborn resistance among buyers. Tooth brushes with red handles find their greatest outlet in lower price stores, while a certain shade of amber is in greatest demand among buyers who are willing to pay a higher price for their preference in color. Certain colors enjoy greater popularity in one part of the country than they do in another. And so it goes throughout industry.

The point is, that color is important to all industry whose wares are expected to sell in satisfactory proportions to recognized competition. And there is definite need for a color language which can be as easily understood as other qualifying specifications. Recognizing this need, the International Printing Ink Company—with exhaustive research and study—has compiled these Monographs and dedicated them to a better universal understanding of the important subject of color.

Because plastics are color—molded, laminated or cast—and because of the importance of color to all industry we have reviewed these three monographs at greater length than is our customary treatment of such literature.

—EDITOR.

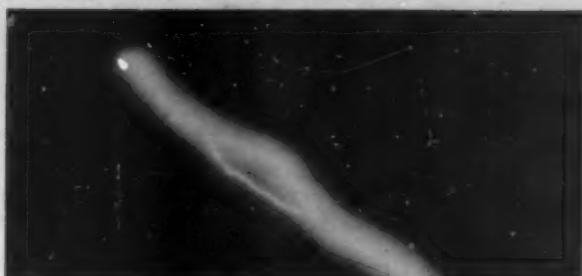
paints to plug, no inks to indicate. They simply say (1) Color chemical, (2) Color physical, (3) Color psychological. The known and proved facts are presented in sound and simple order. Not that any one can fully know color from the presentation. But any one with a fundamental knowledge of high school physics and chemistry can easily follow the first two volumes. And any one with an eye to read and see can follow the last. Not only that, but we must thank the editor or editors for bringing back to many a mind beginning to haze on elemental physics and chemistry a short course resumé of their basic interpretation that can be greatly appreciated by their many readers.

Volume I (Color Chemistry) begins with a treatise on natural sources of color and quickly reaches the modern synthetic sources. Each step in the explanation is aided with descriptive decorations. Atoms, molecules, etc., make easy sense. Then on to organic and inorganic compounds and the complex structure of most colors, as well as the deep dyed necessity of organic compounds in the consideration of color.

"The majority of modern colors are of this type and fall within that immense division of chemistry known as organic chemistry, or the chemistry that deals with carbon compounds. Over 2000 individual color compounds built around carbon are in constant use. A vastly greater number is known; one large manufacturer has discarded over 30,000 (Continued on page 51)







## FOR ELECTRICAL APPLICATIONS



Photo, courtesy General Electric

by *Gerald H. Mains*

CHEMICAL ENGINEER  
NATIONAL VULCANIZED FIBRE CO.

**T**HE early applications of phenolic laminated were in the electrical field, and for many years practically all of the commercial use was for insulation. As phenolic laminated was improved and its valuable properties better recognized, mechanical applications such as gears, bushings and bearings began to assume volume. Following this, decorative and construction applications began to play an important part, and in the last two or three years phenolic laminated has found use in many chemical industries.

In spite of the rapid growth and attention that has been paid to these new fields, the insulation field still remains the major activity of phenolic laminated, in volume equal to or exceeding that of the other three fields combined.

It may be well, then, to review some of the properties of phenolic laminated that have fitted it so well for the electrical insulation field and to consider some of the typical applications it has found suitable and some of the limitations of the field.

*Properties of Phenolic Laminated.* Phenolic laminated consists of sheet material, paper, fabric or asbestos impregnated with a phenolic resin and pressed or molded together under heat and high pressure forming a dense, hard material with the phenolic resin converted to a substantially insoluble and infusible stage.

The following properties of phenolic laminated make it an especially valuable electrical insulator:

(1) Good electrical properties even under high humidities. (2) Strength, toughness and durability combined with lightness. (3) Machinability. (4) Resistance to oil, solvents and corrosive agents. (5) Resistance to heat. (6) Availability in large variety of standard shapes and sizes. (7) Reasonable cost.

A comparison of these properties with those of other insulating materials will readily show why phenolic

laminated plays such an important part in insulation today. Its low water absorption enables it to retain its good electrical characteristics even after considerable exposure to high humidities. Its strength and resistance to oil and to temperatures as high as 125°–150° C. make it usable in applications where hard rubber fails. Because of its strength and lightness it often serves as a combined structural and insulating member. Its density is approximately 1.35 grams per cubic centimeter, about one-half that of aluminum, while its strength per unit weight is greater than that of many metals, exceeded only by some of the steels and alloys. It can be machined readily, and sheets  $\frac{1}{8}$  to  $\frac{1}{4}$  inch thick can be punched out into complicated pieces at high speed and low cost. It is available in sheets, rods, tubes and simple molded shapes. The sheet sizes run up to 4 feet by 8 feet and, for electrical applications, in thickness from 10 mils to 2 inches. In comparison with phenolic molded composition, phenolic laminated is much stronger and tougher, has higher dielectric strength, better machinability and is available in sheet forms as well as in larger sizes and a greater range of wall thickness than in molded forms.

*Electrical Properties.* The electrical properties of almost any type of phenolic laminated are inherently so high that there is an ample factor of safety for the general run of low voltage applications at low frequencies. With the development of the radio field with its high frequencies and the continued step-up in voltage in the electrical power transmission field, insulation requirements became much more rigid. Research by the principal phenolic laminators has resulted in development of improved characteristics and control of uniformity to meet these new requirements.

*Dielectric Strength.* If a piece of insulating material is placed between two electrodes and the applied voltage raised, a point is (Continued on page 57)

# EDITORIAL COMMENT

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**A**GENTLEMAN from Washington, recently released from an important Government connection, phoned me the other morning and asked if he might drop in to talk plastics with me. He wanted to get an intimate view of the concerns engaged in the industry and to make some inquiries about the men who manage them. In the course of our conversation he remarked, "I do not believe the surface of the plastics market has been scratched as yet." I agreed that it hadn't.

"I have given a great deal of thought to the future of plastics," he continued, "and it impresses me as being tremendous. Take the building field, for example. The Federal Housing Administration is releasing millions of dollars for the building and modernization of homes. Most of this money is going into homes of men of moderate means and steady employment. Men who take pride in their homes and want them to contain every convenience and appurtenance for comfortable living with their families. Modern homes need modern materials. How long will it be before builders and those engaged in the manufacturing of building supplies will become aware that molded and laminated plastics are not just new gadgets and empty words? They are the scientific solution to the more objectionable problems of home building. But because they are new materials, builders must become accustomed to handling them before they learn their real value."

Later, when he had gone, I read a release from the Federal Housing Administration and just in case you missed it I would like to quote enough to give you an idea of the amount of money that is available for building and repairs.

"Banks and other private lending institutions of the country did a record volume of business in extending modernization credit under the FHA program during the week ending August 3. In that period a new peak of 17,433 insured modernization and repair notes, amounting to a total of \$5,401,510 were extended by the thousands of private lending institutions cooperating in the program.

"It brought the total business done by the financial institutions in insured modernization and repair notes since the beginning of the Administration's program about a year ago to 291,879, amounting to \$114,169,554. Property owners pledged during the week to carry out \$9,355,204 worth of modernization and repair work during the coming months. The total amount of

pledges obtained by canvassers since the start of the program is \$497,269,321."

That's a lot of money in any language, and it is just one of the steps Government has taken to restore faith and confidence in ourselves and in America. We wonder how many of those property owners know about the advantages of molded and laminated plastics and will make use of them in their modernization plans.

Some interesting examples of what has been done will be found in an article on page 14 in this issue "Laminations for Domestic Interiors."

Another article of interest to builders and owners alike will be found on page 16. It tells how and why London Terrace, a huge modern apartment development, has replaced ten thousand porcelain faucet handles with molded phenolics. This replacement expense, and the dangers of damage suits, can be avoided by builders today if molded handles are specified in the beginning. They cost no more, so why not?

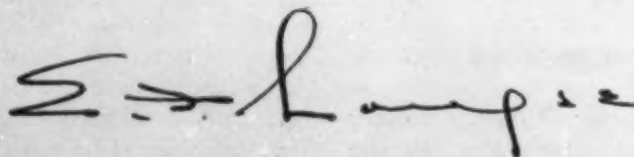
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**M**ANUFACTURER who have been discouraged about using plastics because of the high costs of steel molds will welcome the information that The Gorham Company, makers of silverware, have developed an exclusive process for making cast molds of beryllium copper. With this new method, the time required to produce a mold is shortened somewhat and the cost is considerably less. Furthermore, the metal is 60 per cent reclaimable after the mold has served its usefulness which indicates an additional saving heretofore impossible.

The advantages of this process to the industry are obvious. Sample molds can be made for a comparatively few dollars. Repoussé ornamentation, lettering, trademarks and other decoration which represent fabulous expenditures when they are carved into a steel mold are now possible by simply modeling them in plastaline and casting them in plaster and then in bronze. Multiple cavity molds of any capacity can be made from a single model.

An article setting forth the advantages of the Gorham beryllium copper mold and outlining its limitations will appear in the November issue of MODERN PLASTICS together with interesting illustrations of molded plastics produced by this method.

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WILLIAM A. FREYER



ALEXANDER J. ST. JOHN

*If we were giving medals  
... we'd pin one on . .*

**William A. Freyer**, assistant treasurer and sales manager of Auburn Button Works, Inc., because he came from the bottom to the top with a high school education supplemented only by a course in accounting with Pace & Pace; because he became an accountant with Robert H. Ingersoll & Bros.; because he did his work there so well he found his job still awaiting him after eighteen months in the army during the World War—one year of that in France where he learned to say “oui” and “non,” particularly “non”; because thirteen years ago he saw a future in plastics and joined the Auburn Button Works as accountant; because he soon became assistant treasurer in charge of accounting, credit and collections; because six years ago he was appointed sales manager for the molded plastic end of the business; and finally, because the only thing he likes better than plastics is to put on hip boots and stand in the middle of a likely looking stream, fishing—whether or not there are any fish.

**Alexander J. St. John**, advertising manager of the Celluloid Corporation, because, from a disconcerting start in life which began in Broussa, Asia Minor, he has achieved success through his own well applied efforts; because his education, which began in native Greek schools, then in Robert College, Istanbul, Turkey, was con-

tinued after coming to America and the wherewithal was supplied by his willingness to “jerk” sodas in ice cream parlors and do other odd jobs; because, after graduating from the School of Commerce, Accounts and Finance (N. Y. U.) with a B.S. in Commerce degree, he made several stabs at bookkeeping, accounting and promoting, finally landing with the Celluloid Corporation in 1928; because, here in rapid succession, he was put through a training course, as are all young executives of the corporation, in its Newark plants—assigned to the production control department—loaned to a subsidiary corporation as secretary and treasurer—recalled and appointed assistant to the general salesmanager of the Celluloid Corporation; and finally, because he was recently appointed advertising manager.

**Joseph R. Neill**, president of the Watertown Manufacturing Company, because his individual research, perseverance and skill, which found early expression in a makeshift laboratory in humble quarters, have successfully culminated in a substantial contribution to all industry through the development and manufacture of Neillite a trademarked phenolic resin; because, after graduating from an eastern university, he became interested in chemistry and pioneered in the early progress of thermosetting plastics; because, in 1929, he joined the

Watertown Manufacturing Company as a chemist where he perfected Neillite, a material of uncommon dielectric properties of great value to the electrical industry; because his company not only manufactures the material, but is actively engaged in the production of molded and laminated insulation and novelties; and because he has devoted his life to sustained development and improvement of his self-created products.

JOSEPH R. NEILL





# DRESSERWARE DESIGN WORTH WATCHING

by A. Z. Maisel

**A** CURIOUS and always present phenomenon in the progress of every new material, is the uneven way in which it achieves adaptation in different industries. Because it is one of the oldest of the plastics, pyroxylin offers the best possible example of this process. In some fields, where intensive competition, a style conscious market or other considerations operated, pyroxylin and acetates have achieved wide adaptation. Most notable among these is the dresserware field where designers have moved with the times and where the engineer has kept up with, and even anticipated, the designer's need for new variations in the appearance of his material and the methods of fabricating it.

In contrast, other fields show a retarded development which is not easy to understand until consideration is taken of the factors that induce conservatism. In some cases, manufacturers are committed to large investments in machinery for processing older materials. In others, lack of competition along design lines permits manufacturers to operate profitably without modernizing their products. In still other instances, style is only a small factor in creating sales.

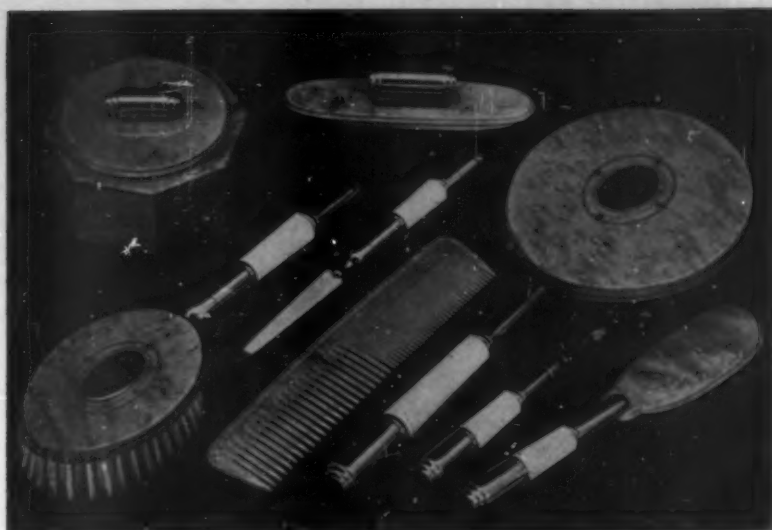
Four distinct ways of achieving effects are combined in the LaVeme dresserware pattern, designed and manufactured by the Celluloid Corporation. Effective shape is attained by fluting the side edges of the otherwise rectangular forms. Color variations broaden the choice without increasing costs; green, peach and horizon-blue being some of the colors available in addition to the black here shown. Engraving and the wiping-in of suitable contrasting color provide an additional decorative note. Handles are brightly finished with chromium plating.

The Sorrento pattern achieves color contrast both by its engraved and wiped-in design and by its heavily plated and brush-finished handles. The tray is partly mirrored glass with handles and feet of Ivory Celluloid.

An outstanding example of this type of retarded development is seen in the typewriter industry. The machine upon which this article is written is a comparatively new model. Yet it contains only two molded parts and these are of hard rubber. An examination or comparison with earlier models discloses the fact that many parts have been made from identical molds or jigs over a period of forty years; cast in brittle iron not because better materials have not been available, but largely because it would involve a lump sum expenditure of several hundred or several thousand dollars to effect a highly desirable change. With little competition, and in a field where style is but a small factor, change comes slowly.







The use of wood veneers, which match or contrast with boudoir furnishings, is made possible when these are laminated with transparent pyroxylin. In this set, lace wood bodies are combined with crystal handles, the latter being partially chrome plated. This and similar designs are also available in other wood grainings and burls

Both design and fabricating processes have progressed a long way since the Celluloid Corporation sponsored this exhibit back in 1885. At that time, one of the principal applications of the material was in the manufacture of collars, cuffs, and bosoms—ventilated, no less—as shown by this advertisement from Harper's Weekly of June, 1881. Noteworthy is the advertising claim, "Contagion proof," for one of the outstanding advantages of pyroxylin, in many of its myriad present-day applications, is the ease with which it may be cleaned and kept clean

**CELLULOID**  
(Contagion Proof)  
**COLLARS, CUFFS, AND BOSOMS.**  
**A Most Important Discovery!**

Although CELLULOID COLLARS have been before the public for the past three years, and their special qualities as to durability, economy, and general excellence have been thoroughly tested and endorsed by the millions, it is only recently that it has been discovered that they serve as a permanent and reliable substitute for the expensive and delicate lace collars, cuffs, and bosoms. This is not surprising when we know that the Celluloid Corporation, who have been manufacturing these articles for the past three years, have given the public a most important discovery. The Celluloid Corporation, who have been manufacturing these articles for the past three years, have given the public a most important discovery. The Celluloid Corporation, who have been manufacturing these articles for the past three years, have given the public a most important discovery.

CELLULOID COLLARS	Price
Woolly Island top	25c.
Alto (same down)	15c.
Open Island top	15c.
Alto and Woolly Island top	15c.
Victor (same down)	15c.
London Island top	15c.

CUFFS	Price
Chambers (same down)	15c.
Victor (same down)	15c.
London (same down)	15c.

**SILCOCKS & COOLEY, 4 Maiden Lane, N. Y. City.**



In contrast, look at your car, as different today from the model of even five short years ago as it is possible to imagine. And even in your car, many parts that cannot be seen are still produced exactly as they were five and ten years ago in spite of technical advances that have rendered them, in a sense, obsolete.

Thus the plastics designer, and the manufacturer who supports and is supported by him, must look far beyond his own field if he wishes to keep up with and anticipate technical and style trends. Whatever the product, jewelry, lighting fixtures, furniture, giftware or tableware, much guidance will be found in studying achievements of the designers of dresserware, for in this particular field designers and technicians have combined to develop dozens of technical improvements worthy of consideration. That their achievements have been greater on the technical side than in the

field of design itself, is a condition arising from a peculiar factor in their own field, a condition which leaves open to other designers, in other fields, wide regions for future achievement.

Dresserware, like other merchandise, enjoys both good and bad design depending almost entirely upon the customer's point of view for its distinction. This is in no way due to the properties of the material from which such merchandise is made. The cause lies rather in the nature of the sales outlets and of the purchasing public which this (Continued on page 62)

## developments of the month



1

1. "Twilight," a new distinctive clock that faithfully tells time by silvered stars on a background of deep blue has been announced by the Seth Thomas Clock Co. The 4 in. dial is durable blue Catalin while the base, half circle support, hands and hour markers are in brushed silverplate. It has an eight day movement. "Matin," similar to "Twilight," has a light Ivory Catalin dial and metal parts of brushed goldplate. Photo, courtesy of Seth Thomas Clock Co.

2. Two of the Pioneer aviation instruments which guide transport planes with such accuracy are shown here fitted into molded Durez cases. Mounting lugs, bezel and vernier bearing are all molded in one piece at the front which fits into a standard size cup-shaped housing. According to the manufacturer, molded cases are used because they resist corrosive atmospheres and are light in weight. Made by Molded Insulation Co. Photo, courtesy of General Plastics, Inc.



2

3. The price tag on the left is made entirely of Lumarith, while the words "a blend" are printed on a slide which is reversible showing another wording on the other side. Dollar sign and figures are molded of red Lumarith and are removable. The price tag on the right has a background of black material die-formed so that molded figures of Lumarith can be inserted. Both tags are made by the Hopp Press, Inc. Photo, courtesy of Celluloid Corp.

4. Handles on these "he-man" jack knives are made with Celluloid scales imitating shark skin. Tough, rugged and good-looking. Others, with mottled pearl effects, have a more subtle appeal but are equally substantial. The attractive display offers a choice to please all buyers. The Colonial Knife Co. makes these. Photo, courtesy Celluloid Corp.

5. Coty has adopted a urea base for its "Air Spun" powder box. This new powder has been developed by a process which makes an exceedingly fine powder and which requires the protection of a moistureproof base for its container. Plaskon gives just this protection and will not pick up or transmit moisture from counter, bathroom shelf or any other places where the box is placed. The base fits tightly into the paper drum and when the powder is used the base makes an ideal coaster still bearing the Coty insignia as a reminder. Molded by Boonton Molding Co.

6. This is the world's largest camera which has been devised by Fairchild Aerial Surveys and Aerial Camera Companies. The shutter, buss bar ring, insulating housing and cover plate, shutter terminal wire caps and wire bushings, indicator lamp socket plate, operating switch insulator, cable socket shell and panel, and terminal panels for trans-



3



4

5





former, condenser and relay units are made of Bakelite molded and laminated. Photo, courtesy of Bakelite Corp.

7. No taller than an ordinary cigarette and about as broad as a person's thumb, this Coronet Midget camera is England's latest achievements in molded plastics. It uses a regular 16 mm. film. The mottled red Midget is made by the Coronet Camera Co. and presents an interesting example of precision plastic molding. Photo, courtesy of Bakelite Corp.

8. A new flexible steel rule with an attractive molded case has been announced by The Master Rule Manufacturing Co., Inc. The steel tape measures up to six feet and is graduated in sixteenths of an inch. It is so compact that it may be easily carried in the vest pocket. The sturdy case is made of high luster black Bakelite and is molded by the Associated Attleboro Manufacturers, Inc. Photo, courtesy of Bakelite Corp.

9. Just in time for Thanksgiving comes this practical carving set of stainless steel with two-tone Celluloid handles—black and pearl gray. Other combinations of color, equally attractive, may be had. All are packed in a plain gray box. Photo, courtesy of Celluloid Corp.

10. This wall bracket lamp for theaters wired in from two to seven circuits with multiple lighting effects is called "The Fountain." The diffusing drum is made of translucent Formica. A brilliant white light for house lighting is one circuit, all others are for blending colors. This design was created by the King Scenic Co. Photo, courtesy of Formica Insulation Co.

11. A Handy Paper Napkin Holder is being produced by the Northern Industrial Chemical Co. It is made of Bakelite molded in a lustrous walnut finish which will not wear off with constant handling. The color goes all the way through. In addition, the holder may be cleaned easily with a damp cloth. Restaurants will like these. Photo, courtesy of Bakelite Corp.

12. This new permanent waving device is called the "Du-art." The steam chambers and traps are molded in two pieces and then screwed together. They are shown cut away. The clip which holds the steam chamber to the hair is entirely molded of Durez extra strength material. All parts that come in contact with the steam are of a special moisture resisting material. Molded by Remler Co. Photo, courtesy of General Plastics, Inc.



6



7

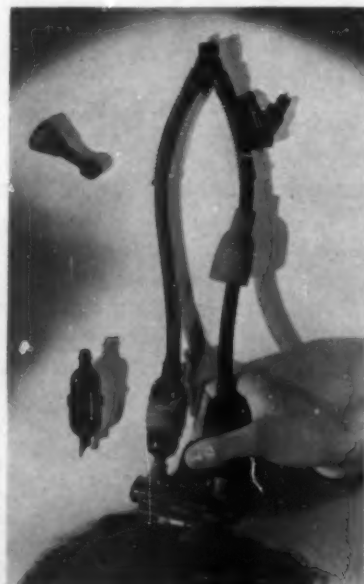


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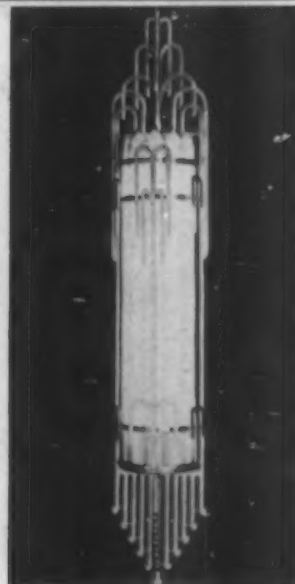
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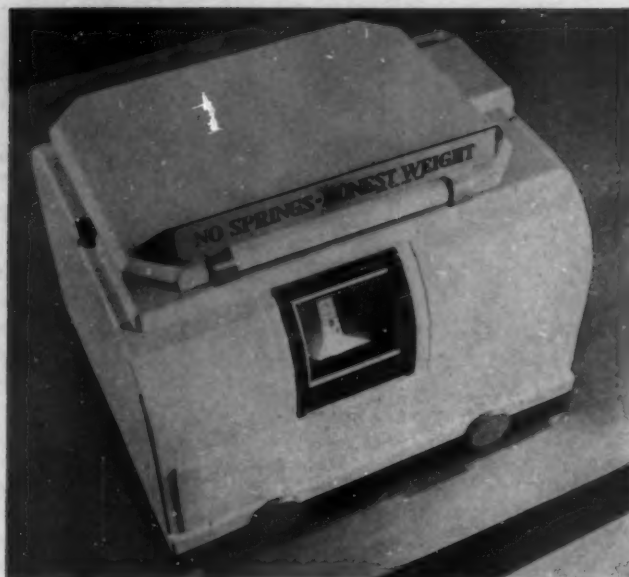




# PLASKON

## UTILITY CASE:

The Plaskon Utility Case—featured by the Parker Pen Company in their *Saturday Evening Post*, *American Weekly* and other national advertisements—provides the new setting for their famous Vacumatic Sets. The case is a notable example of packaging art and of the extra beauty and reuse value Plaskon—molded color—packaging brings. When the ivory Plaskon top is reversed, it becomes a felt-covered display tray for the pen and pencil. Molded by Plastics Department of General Electric.



## SCALE:

In these times, a 100% up in all-times sales competes seriously with the Hanging Gardens of Babylon as a world wonder. That is, however, exactly what the Toledo Plaskon Duplex Scale has accomplished in one month. The compact 55½ lb. Plaskon Molded store model (which replaced a large 165 lb. model) is selling two times faster than any unit ever produced by the Toledo Scale Company. And reason No. 1 is the Plaskon scale cover, the largest molded plastic piece extant.

Because the Plaskon scale cover is vastly lighter in weight and costs less to make than the old cast iron housing; because it does not peel, surface crack, or discolor; because it is more colorful and more sanitary—Plaskon has swept into another unchallenged first place. Molded by General Electric.

# MOLDED COLOR

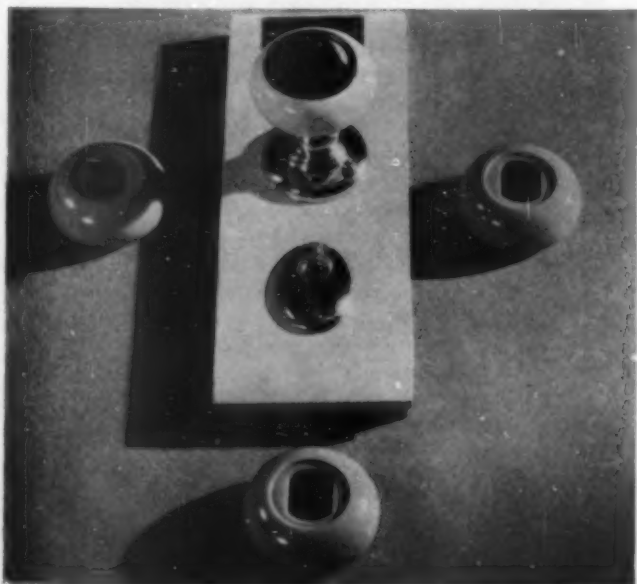


## DOORKNOBS:

From a recent letter by Mr. Duncan Shaw, General Sales Manager, Lockwood Hardware Manufacturing Company.

"This upper bracket line (Patrician Hardware Line) has appealed tremendously to architects and we have had a perfectly astounding reaction in the trade. I have just completed a long trip covering twelve middle western states during which we sold the ace builders' hardware account in each city visited. It was the most unusual selling experience I have ever had, and it illustrates better than anything else the universal appeal of this innovation in builders' hardware."

The Patrician hardware line features Plaskon-molded color-doorknobs, in combination with metal face plates. Associated Attleboro Manufacturers Company, in Attleboro, Mass., has molded them.



## HORN BUTTON:

Another Plaskon automotive application that will garner the attention of the man-in-the-street is the new Packard horn-button—a neat bit of molding, and a worthy follow-upper of the Plaskon dashboard dials and knobs, domelights and window levers that ornament other 1935 car interiors. From an unrivalled color range Packard selected mouse grey as the shade exactly suitable to combine with the center metal insert. Molded by American Record Corporation in Scranton, Pennsylvania.



T O L E D O S Y N T H E T I C

# NEW IDEAS

● Because rubber is decidedly not oilproof it is not a suitable material for packing rings and the like if they are exposed to oil or grease in service. Numerous other materials have therefore been tried for the purpose. One of the newest, which is said to be extremely insoluble in mineral, animal and vegetable oils, is a synthetic hydrocarbon resin. It is made from relatively cheap chemicals, namely, ethylene dichloride, benzene and aluminum chloride (the last serves as catalyst and does not appear in the product). The best compositions for oilproof rings are made by blending this resin with a suitable proportion of rubber, and curing with sulfur. The product has good flexibility and elasticity, with high resistance to water, acids, alkalies, oils and greases. (Naugetuck Chemical Co., French Patent 743,753 and addition 43,916/-743,753.)

● Phonograph records and other molded shapes can be successfully made from cheap gelatin plastics by suitable treatment of the gelatin with plasticizers (lactic acid, castor oil or the like), indurating agents (aluminum acetate, water glass or a natural resin) and an insolubilizing bath of sodium formate solution. The proportions and conditions of treatment are adapted to the degree of hardness, plasticity or other properties desired in the final product. Dyes may be used to obtain attractive color effects. (Michel Gouss and C. E. H. Leroy, French Patent 767,110.)

● High frequency induction coils are now provided with a magnetic sheath around the magnetic core by a molding operation in which a plastic (synthetic resin or cellulose ester) composition, pigmented with very fine iron powder, is applied directly to the core. The core of the coil may also be made of Bakelite or a like material, heavily pigmented with powdered iron or other magnetic metal; such cores have been known and used for some time. The material for the sheath and the proportion of magnetic powder to be incorporated therein are chosen according to the intended use, for example, to minimize hysteresis losses, or dielectric losses, or Foucault current losses. (S. A. Lignes Telegraphiques et Telephoniques, French Patent 769,427.)

● The electrical industries have so many and such varied demands that the search for insulating materials for specific uses never ends. To meet the requirement of a molded insulation which shall be alkali-proof and shall retain high resistivity when exposed to water, a new composition of synthetic resin and fiber has been developed which, after soaking 24 hours in water, still has a resistance of 175,000 megohms. The resin component is a thiourea-formaldehyde condensation product; the fiber component may be cotton or rayon or, if the molded insulation must also withstand high temperatures, asbestos may be used. The molding powder prepared from these materials, if exactly the right amount of moisture is left in it, can be hot molded under the same conditions which are customary for high speed molding of phenolic resins; thus the latter may be mixed with the molding powder for special effects, or the two resins may be molded together for decorative effects. (H. Römmler Aktiengesellschaft, German Patent 613,670.)

● Unbreakable combs are now made of vinyl chloride resin, in spite of the brittleness which generally characterizes this type of material, because it has been found that the brittleness can be eliminated by a treatment with only about 1% of a dispersing agent. The treatment consists in hot lamination of thin sheets of the plastic; the best dispersing agents for the purpose are made by condensing ethylene oxide with octadecyl alcohol or oleyl alcohol. Combs made from the treated plastic are sufficiently flexible to have a very high resistance to breakage. (Dynamit-Aktiengesellschaft, French Patent 780,469.)

● Molded synthetic resin articles are inexpensively but attractively decorated by a new method in which a paper, fabric, metal foil or wire gauze support is coated or impregnated with synthetic resin in the colors or decorative pattern which is desired, and this design or pattern is pressed on the molded article after it has been hardened, so that no damage to the decorative finish is incurred in final processing of the article. (N. V. Philips' Gloeilampenfabrieken, German Patent 609,094.)

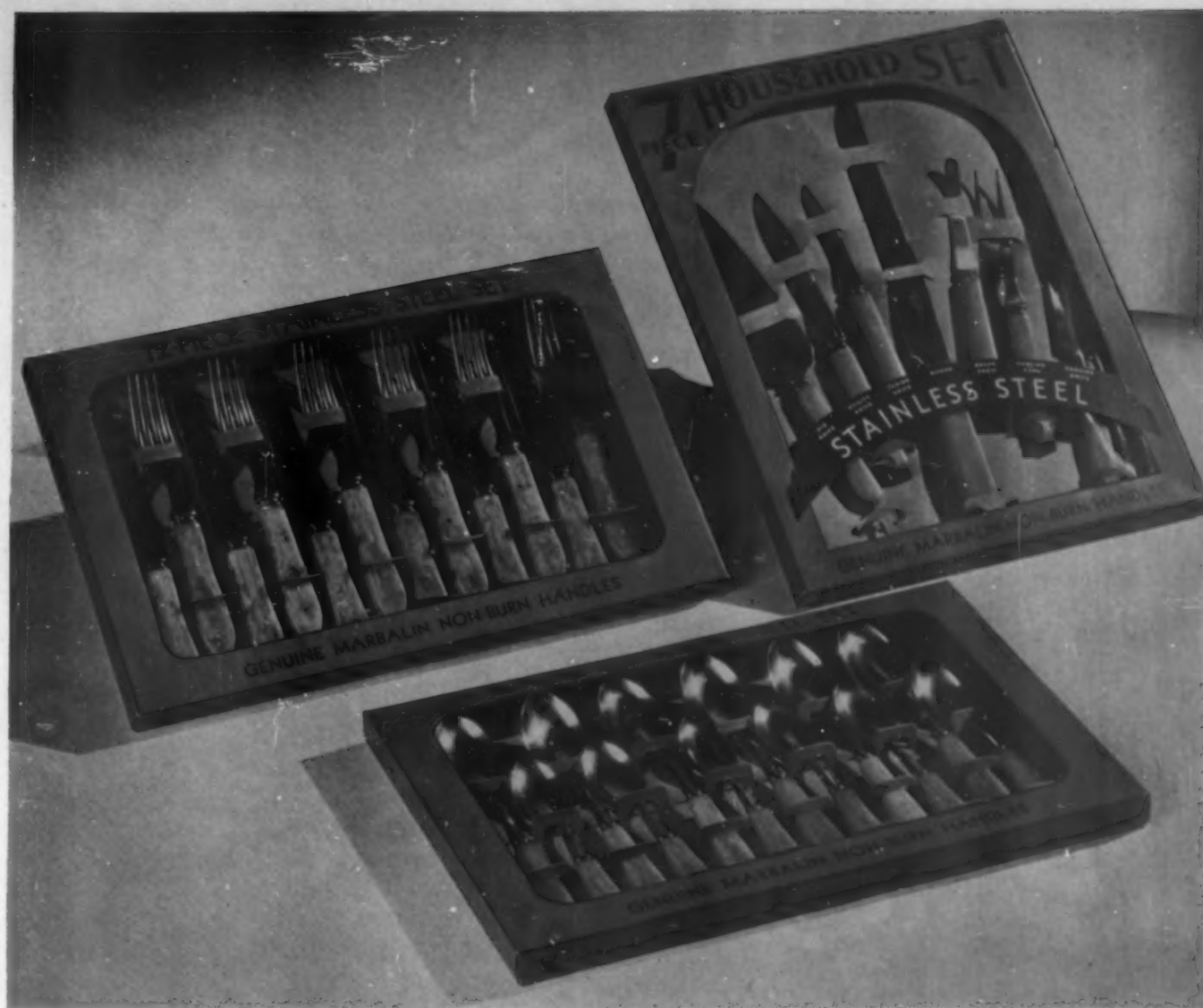
● Horticultural labels are protected from the weather by transparent waterproof sheaths which are open at one end only. The sheaths may be made of cellulose acetate or other cellulose derivative, or of synthetic resin, either by folding a sheet or foil of the material and joining the edges with adhesive or by heat and pressure; or they can be economically produced in quantity by a molding operation. (B. E. M. Miller, British Celanese, Ltd., British Patent 430,354.)

● A new laminated sheet material in which the fibrous structure of the paper or fabric layers is practically obliterated has several important advantages over the ordinary laminated products, as hitherto made with phenolic resins. The loss of fiber structure gives the new product such a thoroughly homogeneous character that it cannot be split, and also permits an increased range of decorative effects because the material itself is translucent and can be colored to give any desired effect. While particularly useful as a substitute for veneer in making furniture and wall coverings, the material can be molded and has excellent electrical and mechanical properties; thus it is also a valuable product for making transformer parts, molded insulation, textile machine parts, silent gears and many other articles. A thiourea resin is used as the resin component instead of a phenolic resin. (H. Römmler Aktiengesellschaft, German Patent 615,400.)

● Out of many attempts to solve the problem of a molded plastic collapsible tube, a new design is offered which is radically different in its method of shortening the tube as the contents are used. Instead of collapsing the tube to eject the paste or cream which it contains, a closure occupying the full diameter of the tube is screwed forward in such a way that each threaded segment of the tube can be broken off after the closure has been screwed past it. The cap at the discharge end, the tube itself and almost the entire closure at the large end are made of molded plastic materials. The price is about the same as for a metal tube. (Pneuvac Co., Berlin; *Kunststoffe*, Sept., p. 231-2.)

● Indurated wood, with phenolic resins as the indurating agents, is finding numerous applications in Germany where importation of hardwoods, as of other materials, is being frowned upon. In machine parts where wood is subject to severe wear, hardened wood (Bakelite impregnated) has given as much as four times longer service life. Silent gears, bowling balls, certain airplane parts, buttons and numerous other articles have advantages when made of indurated wood; in some instances the material is being successfully applied where ordinary wood was never acceptable. When used for wheels on small factory trucks, damage to factory floors is materially reduced. (*Plastische Massen*, Sept., p. 261-2.)





## BRIGHT HANDLES SELL CUTLERY

**W**ITH so many notables arranging smart table settings for prominent shops, it is not surprising that the demand for bright handles on tableware has become increasingly great. Seldom passes a week but some famed actor is persuaded to arrange a table for a Bachelor's Last Supper. Or an equally popular actress is invited to interpret her dream of enchanting environment for Midnight Snacks. Authors, artists and designers are forever obliging.

Released with this flood of talent are many divergent ideas which are picked up by followers of these individuals and become trends. Color is supremely important in the well laid plan of modern living and entertaining, and is therefore prominent in each of the table settings brought into being in this manner. Color, too, is easy to simulate in home settings because it is quickly found in various departments throughout the stores. Even if one hasn't the exact china and glassware admired in a display, it is comparatively simple

to choose a cloth, napkins, and table cutlery of similar colorings and produce a pleasing ensemble. Especially since table cutlery is blessed with cast resin handles of every hue, and is obtainable at prices anyone can afford. It is not extravagant to own several sets.

Watching the ripples from these waves of popular personal expression, the Federal Cutlery Company, Inc., whose distribution was principally in the premium field, has extended its markets through regular retail channels with 150 per cent increase in sales. This company makes knives, forks, spoons and household utility sets of stainless steel with colorful Marbalin non-burn handles perfectly styled to meet popular demand. The transition from premiums to retail was largely a matter of suitable packaging, which in this instance was designed and manufactured by Brooks & Porter, Inc. The cast resin handles which come in a variety of colors, are made for Federal Cutlery Company, Inc., by the Marblette Corporation.

# GETTING FULL VALUE INTO PLASTIC PARTS

by Albert Quincy

**Whether you choose plastics because they are cheaper, easier to fabricate or more colorful, don't overlook the "Plus-values" inherent in these new materials when you plan your product**

**T**HE manufacturer or designer who concentrates too intently upon one single advantage of any plastic material when planning plastic parts may overlook other incidental advantages of equal importance. If plastics are chosen simply to replace other materials because they are cheaper or more easily manufactured into convenient parts, the true nature of these new materials and their unique methods of fabrication should be fully considered. Otherwise, the saving made by such replacements may be easily wasted in unnecessary manufacturing and assembling operations.

These following examples from the pocket accessory field will serve to illustrate the point. Here plastics have long been used for pen barrels, pencil handles, search-light containers, etc. Yet in three separate instances within a few months, thoughtful designers have produced articles in this field which have taken additional advantages of plastics to achieve new and greater utility for long familiar objects.

This Nite-Lite pencil (below) makes clever use of cellulose acetate to combine the functions of a flash-light and pencil for writing in dark rooms. And here (beneath it) is a tiny flash-light for finding things in the dark—especially keyholes. Fits in vest pocket, purse, on watch chain or key ring. The translucent molded urea cap becomes aglow when battery is in contact with bulb.



The Pen-n-pencil Company has long used molded barrels for its writing tools. Drawing on the background of his own experience, designer Kahn of that company felt that a definite need existed for a pencil that would carry with it a small magnifying lens to facilitate reading such small type as telephone numbers, an operation which goes hand in hand with the use of a pencil.

Rejecting the first thought of using glass, Mr. Kahn sought some material less likely to break under the

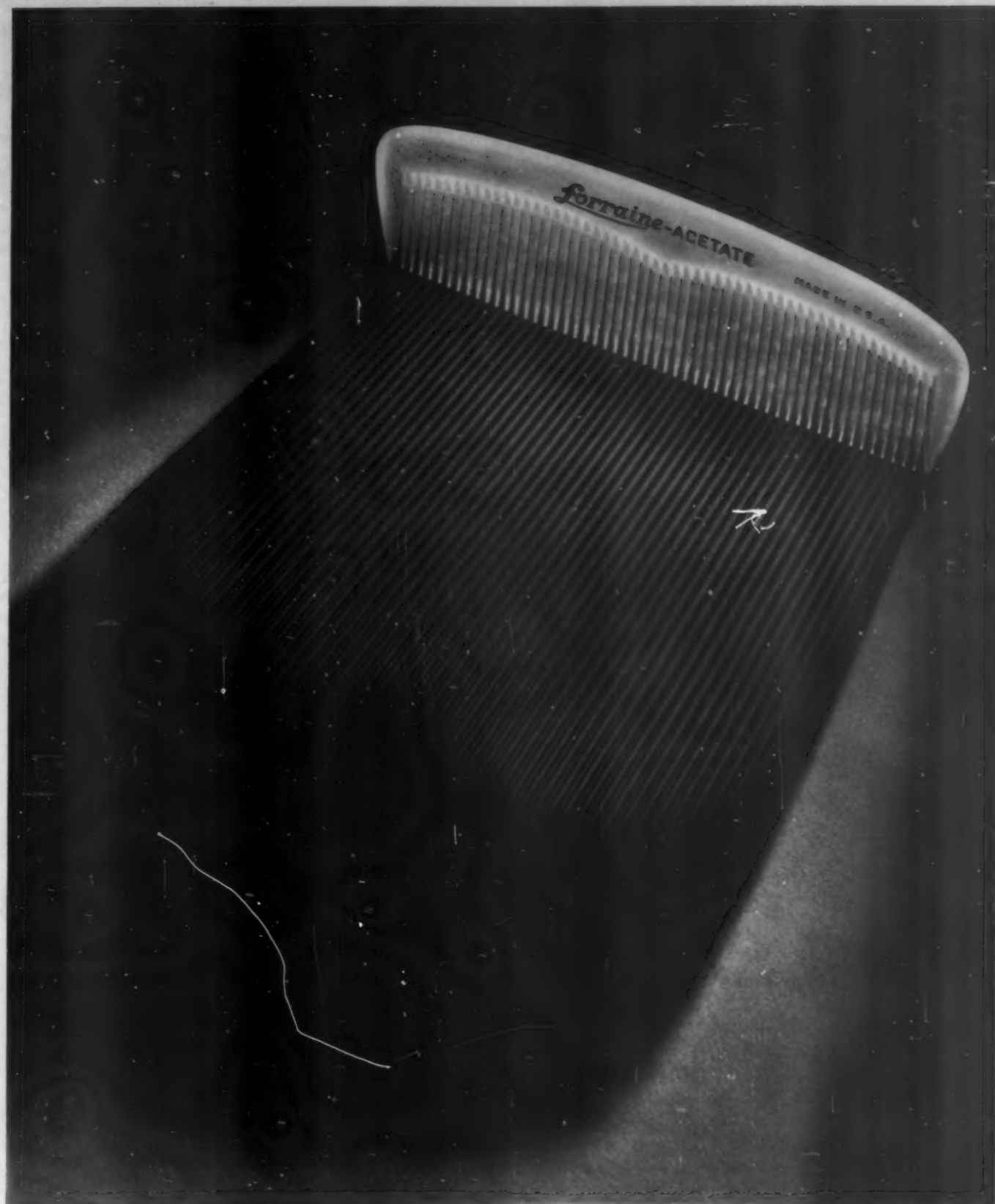


Here's a pencil (above) that will not only write down telephone numbers but will look them up in the book as well. The magnifying handle is made of shock resisting clear cast resin made flat on the under side

shocks incidental to the rough handling a pencil naturally receives. He found it, naturally enough, in the form of crystal clear cast resins. A bar of this material was therefore threaded to fit into the molded tube which forms the base of a mechanical pencil and faceted, on one side, to form a perfect magnifying lens. Highly polished, this lens makes small type clearly visible to the most feeble eyes, even under poor light.

Consider next the Nite-Light Pencil, designed and manufactured by the company of that name. Here it was desired to combine the functions of a pencil and a search-light—so that either might be used separately or together when it is desirable to make notations in a darkened room. Particularly among music students, movie and theatrical atten- (Continued on page 48)





Lorraine comb molded of Tenite. Sold exclusively by F. W. Woolworth Company

**TENITE** gives the Lorraine comb the exceptional toughness, resilience, and beauty of coloring which combine to make this comb one of the world's best sellers. Many other leading products are molded of Tenite, because of its non-breakable character and unlimited color range. Send today for illustrated booklet on Tenite uses.

**TENNESSEE EASTMAN CORPORATION** (Subsidiary of Eastman Kodak Co.), **KINGSPORT, TENN.**



## Modern White Radio Cabinet from England

*by W. Hamilton Gordon*

**O**NE of the leading radio manufacturers in the United Kingdom is E. K. Cole, Ltd., of Southend-on-Sea, and this firm has attracted a great deal of attention through the molded radio cabinets it has put on the market during the past twelve months in its Ekco range of receivers, one recent design of which is illustrated here. These molded cabinets have been designed for the firm by Wells Coates, a London architect who, curiously enough, designed several interiors at the headquarters of the British Broadcasting Corporation at Broadcasting House, a building completed in Langham Place not so long ago.

In commencing this new production activity, E. K. Cole state they had in view the aim of producing a cabinet of good quality, consistent with a low price necessary to insure wide consumption. They consider they have achieved this object. From the sales standpoint these molded cabinets have proved very successful and this is largely due to the fact that they stand out from other sets by reason of the artistic appearance and

originality of the designs. They state there is no reason to doubt that first impressions exert a great influence upon the final choice of the man or woman buying a receiving set. They have also been able to achieve economy in production, with a consequent influence on prices. The molding process was adopted in order to produce cabinets of consistently high quality at the economic cost necessary for large scale production. The designs of the product and the methods of manufacture employed have been governed by the material in use. The molding process used, in their opinion, gives a new freedom to the designer and enables him to produce a variety of fresh and interesting shapes.

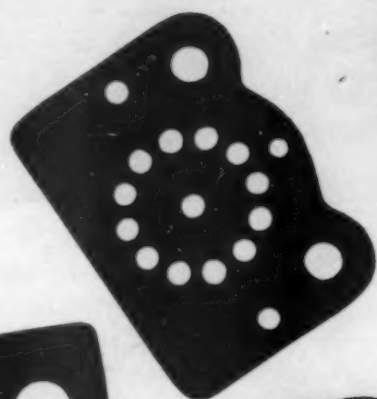
These molded cabinets were originally put on the market for mass sales in a figured walnut finish and an alternative of black with chromium plated cross bars and control knobs. However, later on, fresh ground was broken for the specialty market with models in pearl-ivory and onyx-green.

The molding material used for the cabinet illustrated is white urea. This cabinet incidentally had the distinction of being the only one chosen to represent the radio industry at the "Art in Industry" Exhibition held in London last spring when specimens of the best products of British contemporary industrial technique were on show. It had the result of provoking the prolonged attention of the Prince of Wales and the Duke of Kent when they visited the Exhibition.

Apart from the commercial success which has attended its development, the cabinet is of considerable technical interest. Being 14 inches tall, it is one of the largest mass-produced moldings ever marketed in the United Kingdom. That it attracted the public is shown by the sales figures, which are reported by the manufacturers to have been over 100,000 during the radio season. No figures are available to show what percentage of this total represents the "colored" cabinets, but the manufacturers infer that sales of these were satisfactorily great in number.

**An exhibit of moldings from England and Germany is on display in the offices of MODERN PLASTICS, 425 Fourth Avenue, New York, where manufacturers, molders and designers are cordially invited to inspect them at their convenience.**





# FORMICA SERVES HUNDREDS of INDUSTRIES!

**A**N unusual combination of properties enables Formica to serve hundreds of industries in many different ways. For nearly 25 years it has been used by leading American electrical organizations as an insulating material; it is a silent gear material in machines of many types used for many purposes; the aviation industry uses it for airplane cable pulleys and bushings; chemical industries take advantage of its chemical inertness to build with it parts that are required to resist alkalies and acids; it is used for truck tires on factory trucks because of its resilience and wearing qualities.

If any of these types of service are of interest to you, write us for facts and quotations.

**THE FORMICA INSULATION. CO.**  
4672 Spring Grove Ave. Cincinnati, Ohio.

Celestial Pyralin Toiletware representing a new departure in plastics which portrays a realistic cloudy tone. The colors are: Temple of Heaven Blue, Sun Rose, Thunder Mist (an orchid tone) and Cloud Bank (white)—developed by Howard Ketcham. Handles are of clear carved Pyralin



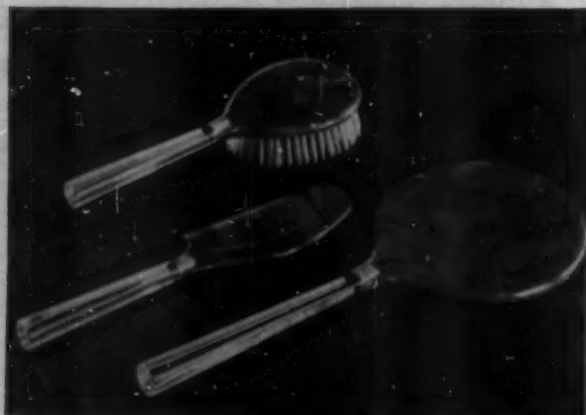
**A**UTHENTIC colors of unusual exactness in their particular representation, with development of color motifs by Howard Ketcham, formerly director of the Duco Color Advisory Service and editor of the *Automobile Color Index*, characterize three new toilet set designs announced as a Fall offering by the du Pont Viscoloid Company. The new sets carry designs, colors and combinations of colors vastly different from any heretofore shown by this company, and are a dis-

tinct departure in the use of color in boudoir accessories.

For two of the sets, one representing early American glass and called Regency Period Pyralin and the other a reproduction of the colors of the heavens and called Celestial Pyralin, a special type of pyroxylin plastic was developed for each. These sets are outstanding for their correct styling, authoritative color and utility, and one or the other will blend perfectly with present-day boudoir ensembles.

The Regency Period Pyralin follows hand-made American glass of the early part of the last century. Its colors are suggestive of "End of the Day," a distinct term which the company has adopted, and which the names of the colors represent. The colors are Dusk Rose, Vesper Green, After-Glow Purple and Candle Light Yellow. The latter conforms with the three-tone color trend that has been so popular. It is comprised of yellow and white, with accented touches of the new cinnamon brown. White serves as a background in combination with Dusk Rose in an ensemble and in combination with Vesper Green. After-Glow Purple is a mixture of vivid contrasts in purple hues.

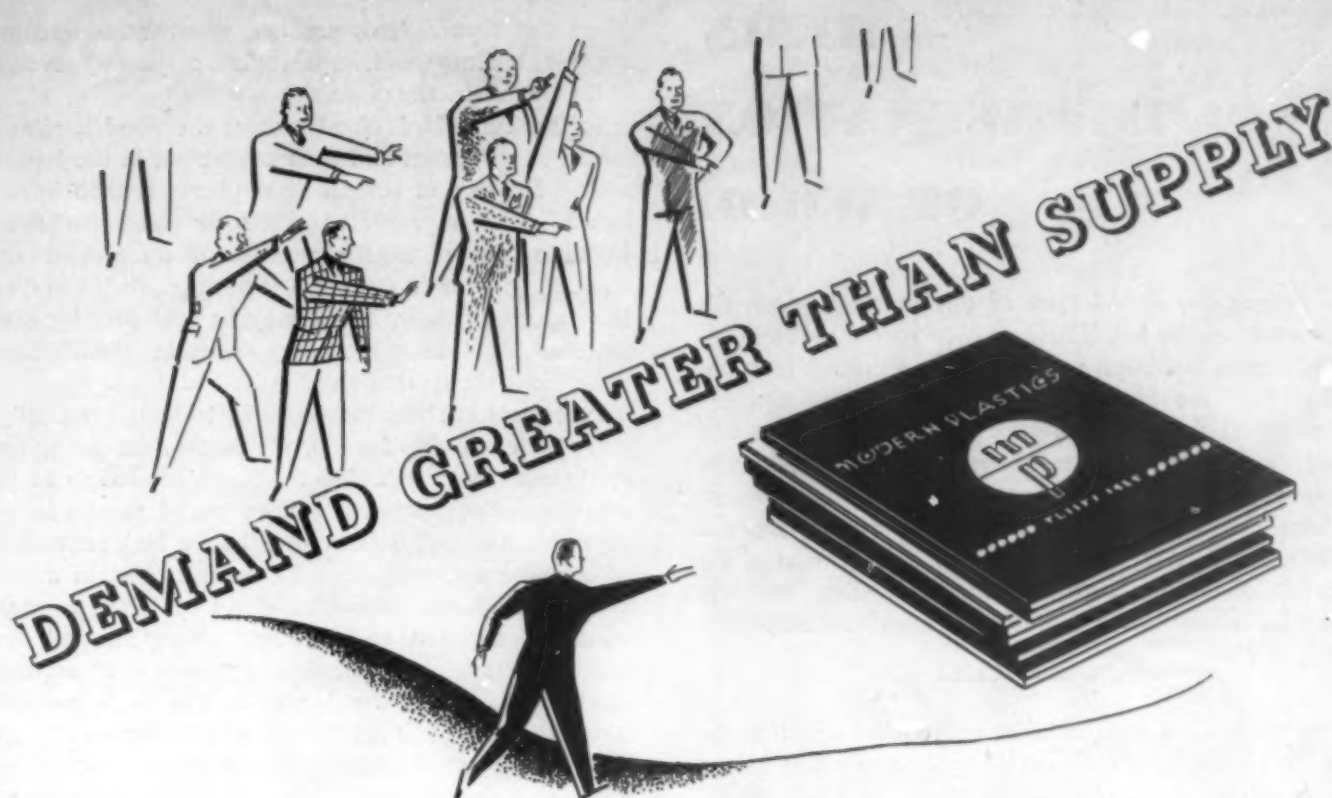
(Continued on page 51)



Palette Pyralin Toilet Set in Coral, Gold, Lilac and Mediterranean Turquoise with inlaid metal decoration and cellulose acetate crystal handles to match—shown top left

Regency Period Toiletware with an effect of hand-made American glass inspired by the "End of Day" colors carefully devised by Mr. Ketcham. There are Dusk Rose, After-Glow Purple, Vesper Green and Candle Light Yellow. Handles are clear cellulose acetate suggesting crystal—shown at left





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**MODERN PLASTICS**

425 FOURTH AVENUE

New York, City

OCTOBER, 1935

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# RESIN IMPREGNATION OF WOOD

Among the varied lines of development which the plastics industry has followed in its recent research efforts, none has been more exciting to the lay imagination than the idea of a resin impregnated wood—combining the advantages of plastics and wood and adding thereto further advantages possessed by neither alone. Between promise and performance, however, there lies a long research and development process. MODERN PLASTICS here presents the first report of the results of one firm's research . . . now climbing out of the laboratory and into the early commercial stage.

**N**O natural raw material approaches wood in the variety of its industrial applications and in the volume of production which these applications involve. There are, however, a few characteristics present in all woods, which tend to limit applicability to certain fields and to make more expensive the use of wood in other cases.

Perhaps the foremost of these is the volumetric change which occurs when wood is brought into contact with moisture. Even a slight change in humidity will, in most woods, cause a swelling or contraction. Since moisture absorption or loss is almost invariably even throughout the piece of wood, warping and checking are the inevitable results of changes in moisture content. Attempts to limit warping have followed two lines of thought. One school has sought to check warping by providing a balance between stresses within the wooden object, to the end that a tendency to twist in one direction will be countered by a similar tendency to twist in the opposite direction—the net change being a total zero. The laminated plywoods are the product of this school of thought and, while ideal for many applications, their use is limited and, in fact, impossible in certain fields.

Another school has sought to end entirely or to reduce to a minimum, the moisture absorbing possibilities of wood. Thus, if the aim is achieved, changes in atmospheric moisture would fail to affect the wood because of their inability to change the moisture content of that material. To this school, the plastic resins have proved a tremendous boon.

A brief survey of patent literature will reveal the amount of work carried out on projects of this nature by others, but apparently none of them has been successfully commercialized.





The Pyratone Products Corporation of Chicago has produced a process, using a synthetic resin of the phenol and formaldehyde condensation type, known as

*Temp-Urd Wood*. This product, when introduced or impregnated into wood, improves in a major way several of the characteristics of wood.

In the Temp-Urd Wood process the wood is maintained in a vacuum and then submerged in the liquid resin. Pressure of several atmospheres is then introduced. The impregnated wood is thereupon subjected to a cure at 200 degrees Fahrenheit for about one hundred hours. At present it is not permissible to disclose specific details, but it may be said that by this process, absolute uniformity of resin distribution throughout the treated wood is secured.\*

Processes have been developed for treating practically every article made of wood, the process depending on its ultimate use: golf club heads are treated so as to give maximum hardness, resiliency and resistance to abrasion; baseball bats to give them a high resistance to chipping and splitting. In the construction members for airplanes Temp-Urd Wood combines to give hardness, abrasion and bending strengths, and resistance to moisture to the already present lightness and flexibility of the natural wood. The impregnation serves to harden the surface, thus affording a substantial backing and eliminating the operation of filling the pores, or a primer coat. Lacquers and varnishes may be readily applied to the surface of the impregnated wood in the coating process.

Following are the results of mechanical resistance tests of hard maple which have been confirmed in very well-known laboratories, among them the Forest Products Laboratory of U. S. Department of Agriculture, at Madison, Wisconsin.

	Crushing strength at elastic limit 	Fiber stress at elastic limit 	Maximum crushing strength 	Hardness 
	Perpendicular compression	Parallel compression	Parallel compression	(Av. radial and tangential)
Control Average	1868	6360	12,600	1955
PYRATONE Impregnated Process No. 1 Average	3080	7270	14,660	2988
Per cent Increase	65	14	16	53

Note: Allowance is made for difference in moisture content.

The specific values given are based on preliminary tests of a limited number of treated specimens and matched controls, and apply to specimens 1 inch square in cross-section, except hardness, which were 2 by 2 1/2 inches in cross-section.

For articles such as handles, wooden bowls, trays—wherever a high, glossy, dur- (Continued on page 61)

\*Editor's note: We are informed on good authority that absolute uniformity of resin distribution is difficult to obtain unless the wood is thoroughly roughed preparatory to impregnation.



# Keeping Posted

## Architects' Show

The fiftieth annual National Exposition of Architecture, Decorative and Industrial Arts sponsored by The Architectural League of New York and originally scheduled to be held at the Grand Central Palace from October 10 to October 19 (MODERN PLASTICS, July, 1935) has been postponed to February 10, 1936, to February 19, inclusive. This was brought about because a change in the schedule of the exhibitions at the Grand Central Palace made it possible to advance the dates of the exhibition to a better time. Circulars carrying the new dates are being sent out at the present time.

## Improved Brake Lining Resin

Increased speed in motor cars brings need for increased stopping power of brake lining, and to cope with the terrific frictional heat and wear developed in the newer cars, General Plastics has recently developed two improved resins for incorporation in rubber linings as well as the impregnated woven type. The use of these thermosetting phenolic resin products gives greater water, oil and heat resistance to the linings and results in a more uniform coefficient of friction, thus giving longer wear and better braking qualities. The two Durez resins are known as 175 resin for use in conjunction with rubber and Durez 1606 resin for the impregnated woven linings.

## F. P. Cox Retires from "G. E."

With the retirement of F. P. Cox as manager of the West Lynn, Mass., works of the General Electric Company, Nelson J. Darling, manager of the River Works of the company at Lynn, assumed management of both plants, it has been announced by vice-president W. R. Burrows. Mr. Cox has been associated with the General Electric Company 45 years. Mr. Darling in his new duties will have N. M. DuChemin, formerly superintendent of the West Lynn works, as assistant manager in charge of operations at West Lynn.

## Kuhn & Jacobs Buys Building

The Kuhn & Jacobs Molding Co., Trenton, N. J., has purchased two brick buildings which were formerly a part of the Monument Pottery Co. on Ingham Avenue. Plans are now underway to make extensive improvements in the holdings and about fifteen thousand dollars will be spent in the work. The plan calls for one new building which will be used as a boiler room. When alterations are completed, the company will move there from its present location on Prospect Street. About one hundred and twenty-five persons will be employed.

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High Speed  
Positive Pressure  
Close-coupled

## Molding Presses

For maximum production, LOGEMANN high-speed molding presses are unequalled. Quick closing and opening produce high output, without lost time or unnecessary motions.

Full pressure can be positively maintained during "curing." This eliminates spoilage through decreased pressure, and insures pieces that pass the most rigid inspection.

With built-in pump and fluid tank, unit is entirely self-contained. Its compact, close-coupled appearance appeals particularly to users requiring multiple units, but limited as to space.

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230 Fifth Avenue, New York, N. Y.



# Literature

Booklets mentioned in these columns will be sent without charge to executives who write for them on their company letterheads.

## Mixers and Autoclaves

The Struthers-Wells Co. has just published a fifteen page booklet on mixing equipment describing and illustrating its machines with graphs, dimension tables and photographs. According to the booklet S-W mixers are just as highly efficient as they are highly specialized. Equipped with complete facilities, including x-ray equipment and annealing furnaces, Struthers-Wells manufactures a wide variety of mixers and autoclaves for all practical working pressures—vessels that meet all insurance and safety requirements and conform to the highest standards of the A. S. M. E. Codes.

## Quick and Easy

How to efficiently move, stack or store practically every article manufactured, handled or warehoused is graphically illustrated in a new colored folder, No. 311, just issued by Lewis-Shepard Company, Material Handling Equipment Engineers.

This new free piece of literature probably shows more pictures than one has ever seen before on a sheet of the same size and is virtually a quick and valuable lesson in industrial efficiency so far as handling of materials is concerned. Many new materials handling methods are illustrated.

## Monsanto Current Events

Monsanto Chemical Company's monthly house organ contains twenty-seven pages of short articles and illustrations on activities of the company in various fields. There is one particularly interesting story on research in the chemical revolution. This revolution is claimed to affect modern life, collectively and individually, and reaches into practically every field of endeavor. It divides industrial research into three activities: research for production, that it may be efficient; research for expansion, that a company may grow; and research for insurance, that a company may not suddenly be overwhelmed by scientific and technological developments.

## How to Pay Salesmen

As business continues to improve and sales policies are modified in the light of changing conditions there is likely to be an increasing need for readjustments in salesmen's compensation plans. This is revealed by a new report issued by the Policyholders' Service Bureau



of the Metropolitan Life Insurance Company, under the title, "Selecting a Plan for Compensating Salesmen." The report presents guiding principles in the set-up of salesmen's compensation plans, as evolved from the experience of hundreds of companies whose plans were studied as a basis for the report. A summary is also presented of advantages and disadvantages which have been found in both salary type plans and in commission type plans.

### Laminated Phenolics

The Synthane Corporation has issued a new folder, "Synthane Laminated Bakelite for Mechanical Applications." This attractive folder contains the essential physical, electrical, chemical and mechanical properties of Synthane, some of the more important material strength values, representative uses, machinability, types of stock, shapes and colors. Due to the increasing trend toward the elimination of gear noises, one section of the folder deals with Synthane Silent Stabilized Gear Material and methods of gear cutting.

### Modernizing Buildings for Profit

by Kenneth Kingsley Stowell, M. Arch.  
Prentice-Hall, Inc. (\$6.50)

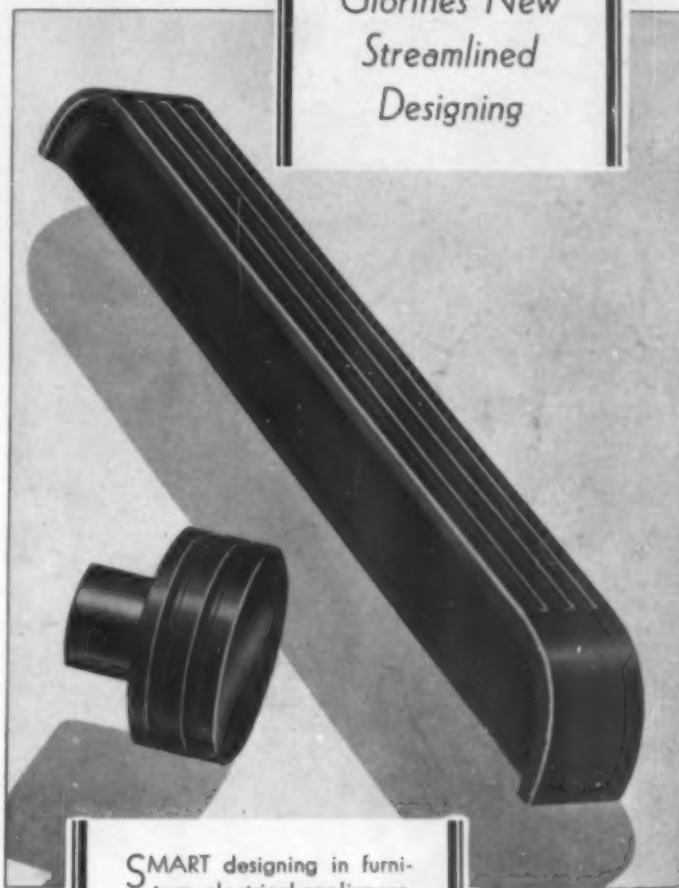
In the two hundred and thirty profusely illustrated pages of this volume, Mr. Stowell, former editor of the *Architectural Forum*, presents what might well become a bible for building owners, architects and builders. Following the case-history method and supplementing this by a detailed analysis of the methods of studying building modernization possibilities, the author has gathered together a host of practical examples of recent modernizations ranging in importance from the altered store-front to the rebuilt hotel, apartment house and office building.

Yet, while this volume should bring joy to the hearts of architects (for whom it will no doubt develop much business), it provides a dismal picture of the penetration of plastics into this important section of the building field. True, some of the finest examples shown particularly among the bars, store fronts and their interiors, and building lobbies, are built around laminated plastics. But, in comparison to the opportunities offered, plastics of this order have won only a minimum acceptance—if the illustrations here shown are to be taken as typical.

The first answer of any one acquainted with the actual extent of plastics usage will be to deny the accuracy of the impression created by the author. Plastics producers and many architects will cite numberless instances in which alteration jobs have been made practical only because of the existence of these materials. A host of examples of unusually fine work of this order may be cited; jobs which, from both an architectural and a cost standpoint, hinge around the unusual

## AMERICAN RECORD PLASTIC MOLDING

*Glorifies New  
Streamlined  
Designing*



SMART designing in furniture, electrical appliances, automotive appointments and general household articles calls for the modern application of plastic molding. The handle and knob drawer pulls pictured are typical of American Record Corporation's part in complementing streamlined products. Lustrous plastics in black, white and molded color offer the striking contrast that streamlining requires for the ultimate in effectiveness.



MOLDED PRODUCTS DIVISION



**AMERICAN RECORD CORP.**

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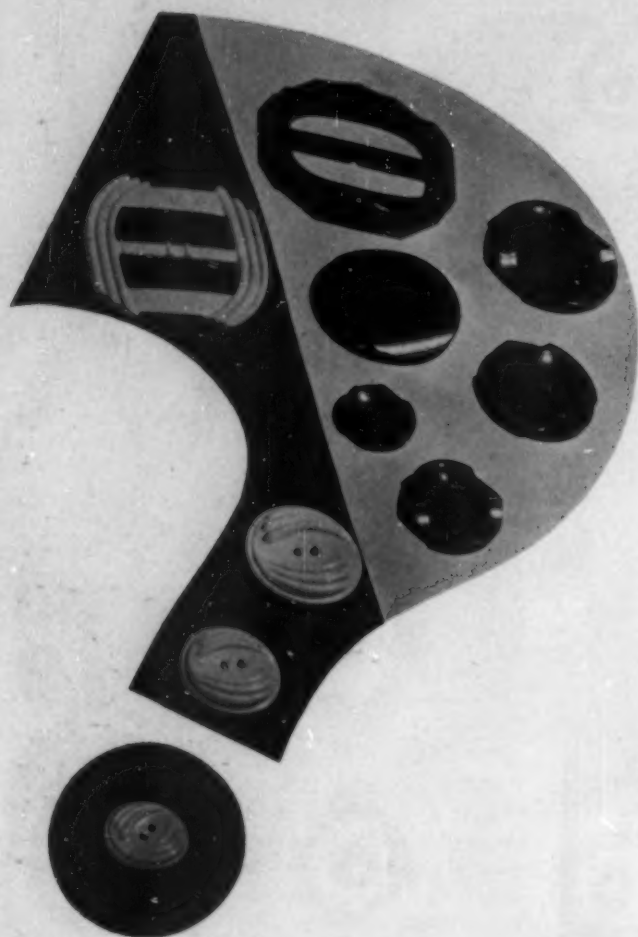
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OCTOBER, 1935

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## What have OUR BUTTONS to do with YOUR PRODUCTS



Auburn is one of the largest manufacturers of molded buttons. Auburn is one of the largest of custom molders. And, between the two branches of our business, our plant keeps uniformly busy, our overhead never gets a chance to run up-scale.

That is one reason why Auburn can assure you more for your molding dollar. For almost 60 years of diversified experience have taught us how to keep costs low while keeping quality outstandingly high.

**Auburn Button Works, Inc.**  
**Auburn, N. Y.**  
Established 1876

fitness of laminated sheets for redecoration, wear resistance, fine finish and long use.

Yet exemplifying these instances exposes a primary failure in plastics promotion, for if we grant that in many cases these materials are ideal, then their failure to place prominently in an anthology such as this and their indicated failure to achieve their full potentialities of acceptance is obviously due to a general lack of knowledge of these qualities on the part of architects, builders and those supplying building money. MODERN PLASTICS has had many other opportunities to observe this lack of knowledge in its work among architects. When preparing a series of articles on the subject which ran a few months back, our interviewers found that even the men most highly reputed in the architectural profession were either entirely unaware of the nature of laminated plastics or else had only a vague acquaintance with their qualities, costs and decorative possibilities. While recognizing, therefore, that "Modernizing Buildings for Profit" fails to give a true picture of plastics' present position in the field, those interested in plastic progress might well question whether a more intensive educational campaign is not indicated as necessary by the very fact of this failure.

The author's references to plastics in general are few and far between. A notation of their existence, among a number of other wall surfacing materials suited for redecorating kitchens, is marred by the further implication that laminated plastics are essentially imitation materials, best suited to the simulation of tile patterns. It is precisely this attitude which will retard the use of plastics as true materials, able to admit their own identity and to stand or fall on the basis of their own qualities. In a number of other instances in which plastics are used, their identity is considered so unimportant as to require no notation in the text. This tendency to consider the materials as unworthy of notice is particularly prominent in the sections devoted to bars and store fronts and interiors. While the author may be criticised on this account, here, too, self-criticism on the part of the plastics industry is probably more in order—for properly intensive plastics promotion would have rendered such slights impossible.

Most significant, for all those interested in the application of plastics to building, both in the laminated form and as lighting fixtures, bath-room accessories, kitchen equipment, hardware, etc., is the fact that the every publication of a volume of this order serves to emphasize the growing importance of the building alteration field. The depression-induced restriction upon new building, and plastics' particular suitability—as a "dry," prefinished material—for use in redecoration and modernization work, make this field and the present time particularly appropriate for use as an entering wedge into the general building field. The materials are ready. Their suitability—even their superiority in many instances—has been proved.

One has only to read the article on page 14 of this issue entitled "Laminations for Domestic Interiors" to be convinced.



## Engineering Index

Organization of the Engineering Index National Committee is now sufficiently near completion to begin the actual solicitation of funds, according to the announcement of its chairman, Dr. Frank B. Jewett, president of Bell Telephone Laboratories, Inc., and vice-president of the American Telephone and Telegraph Corporation.

With regional sub-committees, the group includes more than 125 representative engineers, educators and industrialists in various sections of the country. These members will approach, in the next few months, several hundred leading industrial corporations in New York, Boston, Philadelphia, Pittsburgh, Cleveland and Chicago and other cities.

The keynote of the campaign is sounded by Dean Collins P. Bliss of the College of Engineering of New York University, who is president of the Index.

"The primary purpose of the fund we are about to raise," he explains, "is to set in motion a progressive constructive program. Of the value of the Engineering Index to science and education there can be no question, but it is of even greater value to American industry. The Index is more than an up-to-date record of industrial progress; it is a fountain-head of information which industry must have always available.

"Inasmuch as industry benefits so greatly and so directly from the Index, the obligation of keeping the Index going rests squarely upon industry's shoulders. Hence it is among industrialists that the present campaign is being conducted.

"The program which the fund will make possible will be carried out over a five-year period. Not only will the continued usefulness of the Index be insured for that period, but by the end of that time it will have become wholly self-supporting. And, what is equally important, the Index will have been extended to an ever-widening circle of users through a reduction of the subscription rates until the rates have become only about half of what they are now."

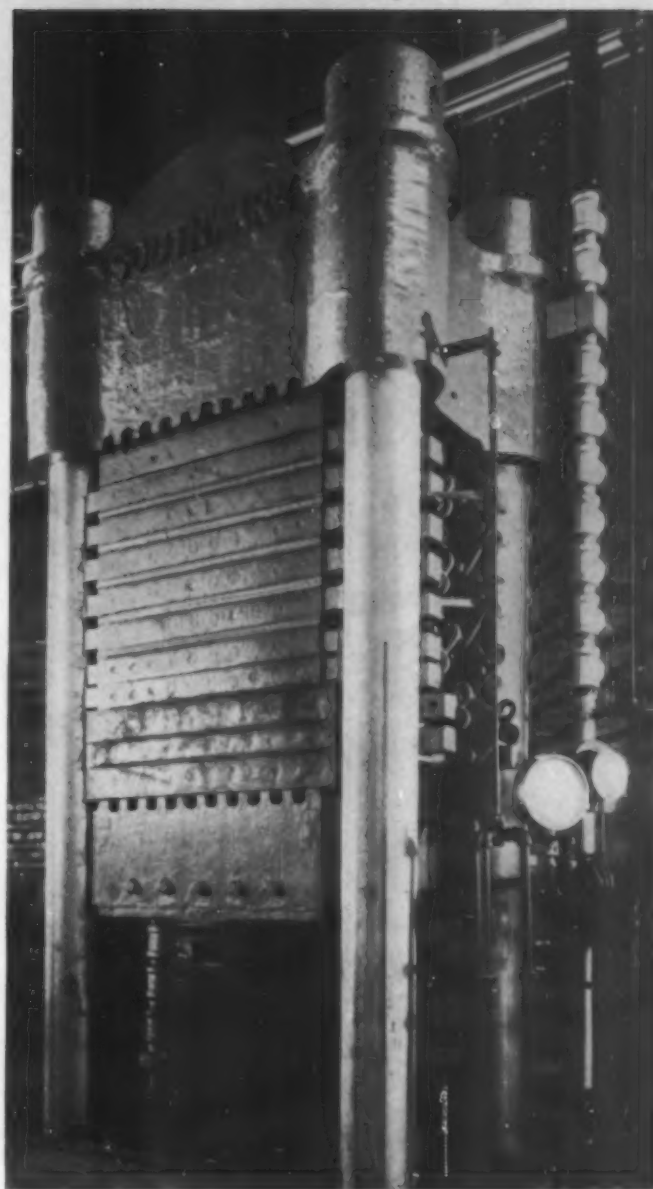
The Engineering Index, for which the fund is being raised, is unique in its field. It may be described as a virtually complete catalog, with annotations, of current technical literature in all branches of engineering.

It is published in two forms: the complete Annual Volume and the cumulative daily and weekly Card Service, including 200 subdivisions.

## IMPACT TESTER FOR MOLDED INSULATING MATERIALS

(Continued from page 17) changes and yet gave the same results as the old one, thus preserving the continuity of the test data and making it conform to the requirements of the A.S.T.M. which were based on the older machine and similar ones built by others.

The most important change was the redesign of the pendulum which is made of streamlined duralumin tubing welded in the Laboratories experimental shops to form a rigid one-piece arm. The duralumin head



## Steam Platen Presses for THERMOPLASTIC MOLDING

Typical of the many Southwark Hydraulic Presses in use in plastics manufacture, the press illustrated is a 38" x 38", ten-opening, 1200-ton steam platen press in operation in the plant of a well-known manufacturer of Phenol Resin Sheet Stock.

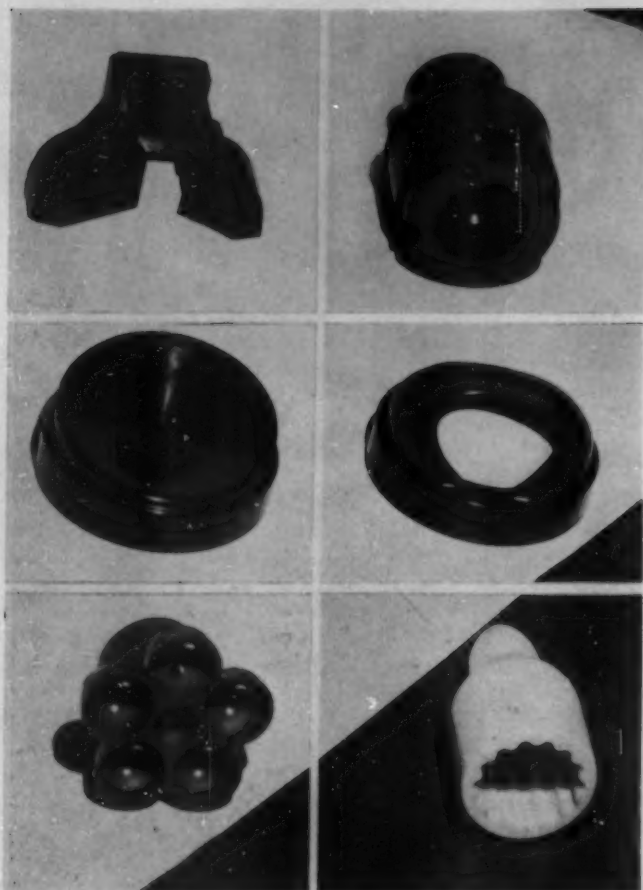
Do you know the economies of the long, trouble-free life that these rugged, rigid, reliable Southwark presses offer?

## BALDWIN-SOUTHWARK CORP.

Southwark Division Philadelphia

Pacific Coast Representatives:  
The Pelton Water Wheel Co., San Francisco





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PLASTIC DIVISION

EST. 1812

WATERBURY, CONN.

NEW YORK CITY BOSTON PHILADELPHIA ROCHESTER  
DETROIT CHICAGO TORONTO

is fastened to the arm by machine screws and final balancing is done by the adjustment of brass weights which are attached to the bottom of the head. These weights are also streamlined which not only keeps down the windage losses but distributes the weight correctly to balance the arm. The base and frame are made of cast iron in one piece and built-in sensitive levels are provided. The scale is chromium plated which not only protects it against the atmosphere but gives a highly reflecting surface which aids in avoiding parallax errors. To assure coaxiality the bearing, scale and pointer are supported on a one-piece holder. An improved release mechanism was also provided.

TABLE I  
CONSTANTS OF IMPACT MACHINE

Length of Pendulum.....	13.000"
Initial Elevation of Pendulum.....	24.000"
Effective Weight of Pendulum.....	1.000 lb.
Capacity of the Machine.....	2.000 ft. lbs.
Distance—Axis to Center of Percussion.....	13.010"
Accuracy.....	About 0.001 ft. lb.

### GETTING FULL VALUE INTO PLASTIC PARTS

(continued from page 34) dants, photographers and others who often work in darkened rooms, such a pencil offers unusually desirable features. Even among others, the convenience of carrying only one cylinder instead of the two that would otherwise be necessary, provides a definite advantage making such a product distinctly useful and salable.

A metal case was called upon to house the search-light switch, bulb and battery, while the small mechanical pencil was firmly attached to a transparent cellulose nitrate shell. The light, shining through this shell, is focused directly upon the writing sheet. Again, plastics provide numerous advantages over the most nearly applicable material, glass. From a manufacturing viewpoint, it was economical to use rod celluloid, turned, drilled and polished to form the plastic lens. By heating, this shell was easily and firmly attached to the metal sections of the light-barrel and the mechanical pencil—a step which, if glass had been used, would have called for difficult threading operations which by no means would have provided as secure a joint. From a utility viewpoint, breakage was eliminated, the tough celluloid easily resisting damage even when dropped from some distance. Once again, advantages inherent only in plastics make possible a better, cheaper and more useful product; not one that merely substitutes one material for another.

Notice, also, the tiny search-light, made by Micro-Lite Co., and shown in the same picture. This was planned as a small utility light to find keyholes and other things in the dark. It can be attached to any key-ring. It was designed to function as a small beacon or night light rather than as a strong flash-light. A



major consideration called for low cost, the item being planned for sale at a price under twenty-five cents. A colored metal shell was used to house the battery. The switch consists of a threaded metal piece at the back which, upon turning, forces the battery against the bulb, into contact.

If customary procedure has been followed, a glass lens and a metal piece to hold it in place would have been necessary. Both, however, were eliminated by using a small molded urea shell which screws into the formed thread of the metal case. A small aperture at the tip of the urea shell permits a direct beam of light to be focused upon the object it is desired to illuminate, the glass of the bulb acting, in this instance, as the lens. Meanwhile, the thin molded shell, being translucent, becomes aglow. Thus plastics, again, serve not merely as mechanical or decorative pieces but also perform other functions attainable only through their use.

In each of these instances, plastics have been successful from a manufacturing, sales and utility viewpoint because they were used as plastics rather than as substitutes. In each instance, the designer has found additional use-values not easily obtained through the application of older materials.

#### GOOD JUDGMENT OF LONDON TERRACE

(Continued from page 16) to tenants who became irate and resorted to law. Artists, sculptors and musicians value their hands at a high figure, and rightly so. But damage suits of \$1000.00 to \$50,000.00 occurring at frequent intervals made prompt action imperative to remedy a distinctly unpleasant and unprofitable situation for the building owners.

"Our first thought was to replace all porcelain handles with those of metal, but there were two factors which discouraged such a course. First, metal handles would be expensive. Then, too, metal being a conductor of heat would become exceedingly hot when hot water was allowed to flow freely through the faucets for any period of time. In our search for a suitable material, we became interested in plastics for the purpose, and were happily surprised to learn that the replacement with molded handles would be about one-third as costly as metal. We began the job at once and now, after nearly two years, our installations, numbering about ten thousand handles, is complete, and as far as broken faucets and resulting law suits are concerned, they are a thing of the past."

It would seem that this lesson in plastics, learned through costly experience by the management of London Terrace, would be of universal interest to those engaged in similar fields. The application of plastics to building hardware is not new. Door knobs have been made of them for some time and are highly satisfactory in comparison with knobs of other materials. Being dielectric, they are shock-proof from static electricity when approached from carpeted floors. Valve wheels for radiators and industrial applications have

## After Years of Investigation

"We have settled on the use of Barco Joints as standard equipment for our Universal Mixers, as they have given us the best of service," says Eugene Schmierer, Chief Engineer, Chem. Engineering Department, Baker Perkins, Inc., Saginaw, Mich.



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Catalog 254 gives full details.

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Swivel 7S-8CS



Statement of the Ownership, Management, Circulation, Etc., Required by the Acts of Congress of August 24, 1912, and March 3, 1933, of *Modern Plastics*, published monthly at Easton, Penna., for October 1, 1935.

State of New York } ss.  
County of Queens }

Before me, a Notary Public in and for the State and county aforesaid, personally appeared Charles A. Breskin, who, having been duly sworn according to law, deposes and says that he is the publisher of the *Modern Plastics* and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, as amended by the Act of March 3, 1933, embodied in section 537, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

Name of—	Post Office Address—
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Publisher, C. A. Breskin,	425—4th Avenue, N. Y. C.
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Editor, D. E. A. Charlton,	225 Madison Road, Scarsdale, N. Y.
----------------------------	------------------------------------

Managing Editor, E. F. Lougee,	55 Morton St., N. Y. C.
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Business Manager, A. S. Cole,	30 Fairfield Place, Yonkers, N. Y.
-------------------------------	------------------------------------

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address as well as those of each individual member, must be given.)

Breskin & Charlton Pub. Corp., 425—4th Avenue, N. Y. C.

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Edith Charlton, 225 Madison Road, Scarsdale, N. Y.

E. S. Gregg, 250 W. 57th St., N. Y. C.

Irene Foster Russell, 431 E. Arch St., Marquette, Mich.

Alan S. Cole, 30 Fairfield Place, Yonkers, N. Y.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.)

None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the twelve months preceding the date shown above is..... (This information is required from daily publications only.)

CHARLES A. BRESKIN, Publisher.

Sworn to and subscribed before me this 18th day of September, 1935.

[Seal]

CHAS. TELLER.

Notary Public, Queens County. Clerk's  
No. 2879, Reg. No. 7102; N. Y. Co.  
Clk. No. 333, Reg. No. 7-T-223.

(My commission expires March 30, 1937.)

been produced and the availability of color in plastics allows visible demarkation of different valves for various purposes. Red, for instance, can be used for the handle of a valve controlling live steam. Its very color suggests danger and instills caution. Black or a neutral color can be used where danger is less evident.

Further investigation of the London Terrace experience prompted the writer to get the viewpoint of one of the large insurance companies. George P. Demellier, supervising inspector of the Great American Indemnity Company is involved directly in liabilities for apartment house accidents. His work covers thousands of apartment houses with millions of faucet handles.

"We've had to pay some pretty fancy sums," says Mr. Demellier, "for injuries sustained from broken faucet handles. In fact, it is not uncommon for us to have as many as seven or eight claims a month from people who have been severely cut in just this manner. In one instance a man cut the sinews in the palm of his hand which partially paralyzed four fingers and he never fully regained their use. Permanent injuries of this nature are expensive to us, it is true, but they are disastrous to the man who earns his living by painting, writing or playing some musical instrument.

"In combatting this condition, our only recourse was to insist that apartment houses insured by our company should take immediate steps to replace all porcelain handles with a less dangerous material or we would be forced to cancel their policies. Metal handles meant considerable expense on the part of the owners and they were justified to some extent in objecting strenuously to our demands, but we had no alternative. We didn't learn about plastics until recently. We are naturally grateful to plastics or any other material which will obviate the possibility of the constant recurrence of such accidents, and because we have learned that molded handles can be secured at a reasonable price, we do not hesitate to recommend them. We feel sure that when the admirable properties of these handles are made known generally, they will find favor in all building projects."

Molded handles for all sorts of faucets, radiators and other equipment where a less stable material has been used are available to builders and architects if they will but specify them. Metals and porcelains have been in use so long that there is a natural prejudice in their favor which must be overcome before plastics will enjoy the general use for such purposes as they deserve.

The plastic faucet handles used by London Terrace are molded of black Bakelite by the Boonton Molding Company, with round or square metal insert to fit any faucet. The letters "H" or "C" for "hot" or "cold" may be stamped in the top of the handle or this space may be used for any other initial or trademark desired.

Molded plastic faucet handles may be had in colors to match any scheme of bathroom decoration and their low cost is an added inducement in their favor. They are easy to clean with a damp cloth and require no polishing. Their finish is permanent.



## COLOR'S GROWING IMPORTANCE

(Continued from page 38) Colors in the Celestial Pylalin design were inspired by the colors in the heavens. They embody the natural beauty of the clouds. This new material portrays a cloudy tone, and is made in four delicate hues. One of these is named Temple of Heaven Blue, and is patterned after the blue in the interior of the Dome of the Temple of Heaven, Peking, China. The other three are Sun Rose, Thunder Mist and Cloud Bank, representative of colors in the sky.

Palette Pylalin is the name of the third set, made of standard Pylalin and in solid colors. These colors are Coral, Gold, Lilac and Mediterranean Turquoise. The particular coral interpretation embodied in this new set was especially sought. A not too positive color, it lends itself admirably to decorative purposes because of the flexibility with which it adapts itself to the maximum number of smart interior color styles. Charm and distinction are added to these sets by inlaid metal decoration and clear cellulose acetate handles in hues to match.

In the production of the Regency Period design, it was found necessary to develop a special plastic in order to authentically reproduce the color effects of American hand-made glass of a hundred years ago.

## THREE MONOGRAPHS ON COLOR

(Continued from page 22) such compounds because they had some undesirable physical property. On the other hand, hardly more than 100 colored materials derived from any of the other elements are used. These non-carbon materials are called inorganic in contradistinction to organic or carbon-containing compounds."

The entire volume (18 printed pages beautifully bound, handsomely illustrated and legibly printed) simply carries on this story of color and the combinations that chemically make and change it. The story is fascinating and the fine graphic presentation is an asset that all text-book printers should behold. The volume ends with a short description of the responsibility of the vehicle in color.

Volume II (Color as Light) is the same simple interpretation of color in its physical phases. Its opening page contains a reproduction of the visible color spectrum. It is easily the outstanding pictorial piece of the monograph and as a printing achievement is likewise remarkable. No screen mars the gradual interpretation of violet, blue, green, yellow, orange and red through all inter-related phases. It is one of the finest pieces of color printing this reviewer has ever seen. Light is dissected, again with the graphic treatment and simple text referred to in the preceding section.

The pictures that show why red glass lets only red light through, and what light yellow, green, blue and purple glass allow to pass are somehow a bit clearer than previous presentations. Then the corresponding transmission curves follow intelligibly. Even as slight compositional changes alter the chemical conception of color, so slight particle size changes alter the physical

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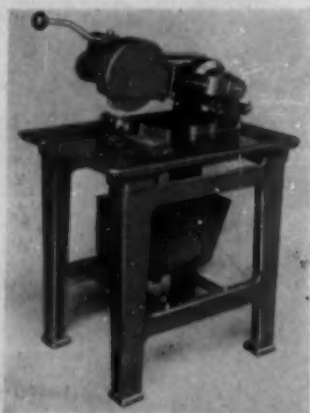
TRENTON, N.J.

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WHITE ENGINEERING LABORATORIES

PATERSON, N. J.

# Phthalic Anhydride Flakes



conception. Again a graphic demonstration accompanies a legible text. The environment of color—another physical value—is surprisingly shown.

"The application of chemistry to color problems has resulted in an ever-increasing wealth of materials with which the user of color has superbly developed the arts. Progress has been somewhat retarded by artists. They have not always spoken the same language. It has been difficult to describe a color just as it was to describe a piece of music before the adoption of a standard method of musical notation.

"The application of physics to the study of color is still in its infancy, but already it promises a color language upon which both the chemist and the user of color can agree. With the general adoption of such a language we may expect the elimination of ambiguity in color terminology, a freer interchange of color knowledge and a more effective use of color."

Volume III (Color in Use, 18 pages text and decorative illustration, 12 full page illustrations) is best described as undogmatic. Color relationships are discussed. The first page is worth quoting in its entirety.

"The user of color, the artist and designer, is especially interested in color as a sensation. To illustrate what is meant by sensation let us try to answer the hypothetical question: Is there any color on an uninhabited island?

"The chemist, thinking of the natural pigments in the rocks or the chemical composition of the vegetation would reply, 'Yes,' and he would be right because color to him is a material thing, definable chemically, which exists even if there is no observer. The physicist, thinking of the rainbow, in the mist or the light reflected from thousands of differing surfaces, would reply, 'Yes.' He would also be right because color to the physicist is a phenomenon of light, and light waves exist independently of observers. Most of us might reply, 'No,' because color to the vast majority is something seen, a sensation in the brain, which presupposes an observer.

"To some extent, however, the user of color must acknowledge all three viewpoints—the chemical, the physical and the psychological. He should know something about the materials which the chemist employs and the processes by which they are synthesized to obtain the proper color. He will want to know whether the pigments are permanent to the degree which suits his purpose and whether or not they have been combined with vehicles which will permit them to work satisfactorily in each step of his problem—his sketch, his finished drawing, photograph or painting, and finally in the reproduction of his work in any of the graphic processes or its manufacture on a mass production scale with the necessary industrial finishes.

"The designer should be familiar with the physical laws by which color behaves as light, the precise measurement of color, and its appearance under standardized conditions.

"In addition to this the designer and user of color must be able to anticipate the often surprising action



of color as the eye sees it, which is loosely called 'the psychology of color.' He must realize that a color which satisfies the chemist's and the physicist's standards may not be satisfactory as the eye sees it either for the purpose for which it must be used, or in the manner in which it is to be used.

"Obviously, a discussion of color would be futile without a language by which color may be accurately described."

A brief description of Munsell three dimensional color terminology follows. Also follows a warning against the overstressed and false theory of color balance resulting in neutral grays. The authors are partial to no theories. Complementary hues, triads, ratio of color areas are all discussed, and discussed with a wholly scientific outlook as to their use. As a closing text note and an introduction to twelve pages of examples of color relationships another quotation serves well.

"It is here that stimulation from worthy sources comes strongly, though often unconsciously, into play. Cold methods of analysis fail to explain the pleasure with which we observe the great gifts of color displayed in the graphic arts and in nature. Subtle color variations and their association with circumstances and experiences of enjoyment and delight enrich our appreciation of the sensation of color in a way which no mere optical demonstration of chromatic phenomena can justify.

"The sketches on the succeeding pages should be approached in this creative spirit, translating the rules rather freely, and supplementing the ideas suggested by them with original experiments to the end that the use of color may suit its purpose more effectively."

If a disappointing note may be inserted, it concerns these illustrations. Rudolph Ruzika admirably expresses his point in most cases. Yet the sensation of grayness pervades the whole. Here too, though the printed execution is good, it is not as good as in his decorative and analytical illustrations. As stressed repeatedly, color can be judged only in conjunction with other color. The volumes are superlative work—what seems a flaw here, might be almost perfection elsewhere.

The books are basic. Here color has no particular ax to grind. But to all industry—to molding, packaging, printing, painting, building, decoration—this volume is an answer. It will tell you personally the things you'd like to know about color in general. With this knowledge you will apply better perception of color to your color problem in particular.

Even to the red book that cases the three volumes it is an achievement. It can be compared to an exhibit of the world's best printing assembled by R. R. Donnelly under the supervision of William Kittredge. Not only the superlative but the ingenious. For the exhibit could be visited in an hour and completely seen—or for days—and completely diagnosed. These books can be profitably enjoyed—even at a cost of \$10.00—in an evening; profitably used for years. We venture "for years," because they've outstripped all predecessors and left a worthy mark for successors to shoot at.

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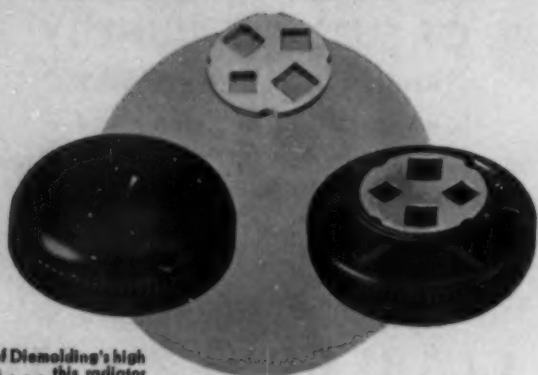
Leominster, Mass., U.S.A.

OCTOBER, 1935

53

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## LAMINATIONS FOR DOMESTIC INTERIORS

(Continued from page 15) kitchens more too, using electrical and mechanical appliances which demand less room than the old cumbersome tools. The dining room, in many instances, is being replaced by the cocktail room, the breakfast nook, and the kitchen.

The former small bathroom, on the other hand, is being given more space as we learn to expect the luxury of a separate standing shower, in addition to the bath tub with which we were at one time satisfied. And, as we live more simply and in closer quarters, we clean walls and all parts of the home more often. Hence, the need for waterproof wall and ceiling materials is greatly increased and can be met with laminated materials.

What are some of the examples of applications of laminated plastics to the decoration of beautiful homes? In what types of homes are these materials being used? What is their future in the home of the average person?

These new materials are being used, first of all, in "model homes"—those small or large houses built by promoters, designers or publications interested in home-owners' problems—to point the way to more efficient home management and healthier and happier living. They are also being used, at present, in the homes of the wealthy. This is to be expected, since laminated plastics are still relatively new as decorative materials and are not as reasonable in price as it is hoped they will be later when volume warrants. But they are gradually being introduced into apartments and homes of people with average incomes.

One of the most beautiful paneling jobs ever done by architects using laminated plastic, is in the home of John D. Rockefeller, Jr., at Tarrytown, New York. Contrasting this example, laminated has also been used in the paneling of a bathroom in a comparatively small Cincinnati residence. Naturally enough, one finds the greatest originality in color and design applied to the decoration of such homes as that of L. Ogden Armour at Lake Bluff, Illinois, one of Chicago's more pretentious suburbs. Or in the home of the Lazarus brothers, of department store fame, at Columbus, Ohio. Or in the beautiful home of W. E. Mahoney at Pawtucket, Rhode Island. In Mr. Mahoney's residence, an old New England house remodeled, the master's bath is done in laminated plastics almost entirely. Its walls are of gray-green laminated, with a wide ivory border inlaid with vertical series of metal inlaid stripes, topped by a band of blue. Even the window sill, toilet seat, baseboard moldings and door casings have been made of this laminated plastic material in dull black. The dressing table also has a laminated plastic top. Cabinets, too, are of this material in ivory. Another bath in the Mahoney residence is handsomely wainscoted in dark red laminated with a black top border inlaid with silver metal stripes.

Unusually attractive applications of laminated plastics appear in the decoration of the home of Don Gardner, publisher of *Modern Machine Shop*, at Cincinnati,



Ohio. The home, equipped with the latest electrical, mechanical and decorative accessories, has among other things, built-in electric wall clocks in the kitchen, study and master bedroom. In each of these clocks the face is of inlaid laminated. The bath has "gone laminated" to such an extent that all exposed surfaces of the room including the lavatory, shelves and walls are faced with this material.

Among other beautiful homes in which laminated plastics have been ingeniously used is the home of a wealthy resident of Birmingham, Alabama, on Shades Mountain, a short distance outside the city. In this forty-room mansion, with its separate three-car garage and servants' quarters, every care has been taken to introduce only the most modern materials available. Its kitchen walls are of two shades—the top is ivory, and the lower portion is a light brown—of laminated plastic with narrow stainless steel bands covering the joints and presenting a pleasing wide panel effect.

In the much talked-of "House of Tomorrow," recently constructed at Miami Beach at a cost of \$45,000 (by Eastman Decorators, Inc., in cooperation with Robert Law Weed, Miami architect) laminated plastics have their first application, so far as we know, for the exterior of a home. The front door of this ultra modern home of Florida keystone, is of scarlet and black laminated resin with a decorative motif at the upper left corner. This motif encircles a mirror panel enabling the resident to see the guest outside but not permitting the person outside to see in. The attractive design of the door makes it seem appropriate to the front of a home in spite of its brilliant color contrasts.

Elsewhere in this "House of Tomorrow" laminated plastics are used for table tops (in the dining room and in the guest bedroom); as facing for a standing screen in blues and greens overlaid with a raised mosaic of gold and silver leaf; and as the major materials for the private bar in the cocktail room. This private bar resembles one in an exclusive club rather than one in a private residence. Its wide top extends out over the rectangular base which is paneled in geometric designs. Laminated materials in four colors and black are used: beige, or tan, for the upper panel; dark jade green; then light jade inlaid with narrow bands of copper; then orange for the step; and black for the wide edge of the bar top and for the face of the step.

In another model house 1500 miles north of Miami Beach—the "House of Tomorrow" in Cleveland, Ohio—a dressing room or boudoir has been given a charming light wall wainscoting of laminated resin. The bath walls are similarly wainscoted, with satin steel horizontal bands for trimming.

In a similar modern model house in Cincinnati—the Stran Steel house, built by Korb and Korb, architects—the sunny breakfast room is wainscoted, ceiling high, with laminated plastic panels inlaid in a top border with small conventionalized designs resembling field flowers. The inlay in the laminated wainscoting matches that in the dark linoleum of the floor.

Most recently installed, perhaps, is the model bath-

# 3 INSTRUMENTS IN



For Surface  
Temperatures



For Within-the-  
Mass Temperatures



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room wall displayed in the "Cincinnati Home Show of 1935." Here a panel of blue, inlaid with gold, decorates the ivory wall. A border adjoining the ceiling is inlaid with gold stars, pleasantly twinkling against an ivory laminated background.

Many other splendid homes have been dignified and decorated in practical and pleasing fashion by paneling with laminated plastics. Mention of them would add little to our story. We feel the fact is assured by the evidence already presented, that wherever architects and builders have been progressive and alert to the possibilities of laminated plastics they have been enabled to do beautiful work for their clients because of them. From daily reports of new installations in homes in many cities throughout the country, it would seem that laminated plastics may in time replace almost all other types of wall coverings in the better types of American home interiors, at least in rooms where cooking, eating, drinking, laundering and functional processes are carried on.

## MOLDING THE TOLEDO SCALE CASING

(Continued from page 13) velocity of the air as it enters to a sufficient extent to eliminate turbulent air currents which might scatter the powdered molding compound. The fan is driven by a 10 H.P. variable speed G. E. motor which provides a means of flexible control of the air movement through the rooms. A maximum of one air change per minute can be secured, if desired.

The development of these large-unit molding facilities should prove highly important to the manufacturers of business machines, radios, electric apparatus, vending machines, recording instruments, scales, slicing machines, beautifying equipment and to other manufacturers whose products require large casings, cabinets and housings, where reduced weight is an advantage.

✓ To these manufacturers, large-unit molding offers:

1. **PERMANENT LUSTROUS FINISH**—parts come from the mold with high polished surfaces that will not dull, rust or corrode.
2. **SIMPLIFIED DESIGN**—coupled with simplified assembly means dollars saved to the manufacturer. Large-unit parts are shipped to the customer, ready for assembly with no costly drilling, tapping or surface finishing required.
3. **MOLDED COLOR**—parts can be molded in rich colors including pastel shades. The color is not a surface finish but penetrates throughout the entire cross-sections.
4. **ACCURATE DIMENSIONS**—every part comes from the mold identical in every dimension according to the manufacturer's specifications. This assures accurate and quick assembly.
5. **REDUCED WEIGHT**—this benefit is twofold. For instance, the reduction of weight (the new



molded casing is less than  $\frac{1}{8}$  the weight of the casing previously used) of the Toledo scale resulted in an easier-to-handle product for their salesmen and customers and a considerable saving in shipping costs—the molded scale casing helped appreciably to reduce the shipping weight of the scale from 205 pounds to 80 pounds.

When we consider the progress made by the plastics industry within the past ten years, the size of the G. E. press and its moldings is not surprising. If we could see as clearly into the future, it might even be considered insignificant. But the fact remains that this engineering project, coupled with advanced molding technique, has brought industry a new opening for development and growth. The Toledo Scale Company, through its new Toledo Plaskon Duplex Scale, points the way.

### PLASTICS IN GERMANY

(Continued from page 19) and are mounted on a black laminated phenolic panel. Design is good and the complete unit is pleasing in appearance. White toilet seats of urea material serve to complete the line and although the cost is a bit high they are produced in fairly good volume.

Considerable attention has been given to cast phenolic resins, and sheets and rods made from this material show many unusual and attractive color effects. Cast sheets have been used for paneling and the finish and coloring are, of course, quite superior to ordinary sheet laminated material.

Translucent phenolic resin for molding is a comparatively new development and a fair volume of this material is being used. The attractive color schemes and exceptionally high lusters make it desirable for certain decorative articles and the fact that it is less brittle than glass results in such uses as automobile tail light lenses.

While all plastic materials have reached a comparatively high state of development in Germany, the most interesting things to an outsider are the injection molding of acetate and polystyrol and the molding of unusually large pieces from phenolic and urea materials.

### FOR ELECTRICAL APPLICATIONS

(Continued from page 23) reached at which the insulation is punctured. The dielectric strength is obtained by dividing the breakdown voltage by the thickness and is generally expressed as volts per mil.

From the emphasis placed in published tables upon the dielectric strength of a material perpendicular to the laminations one might receive the impression that it is the sole or dominating electrical characteristic of an insulating material. Quite the reverse is true for most electrical applications. Almost any organic laminated insulation material will have a high dielectric breakdown perpendicular to the laminations

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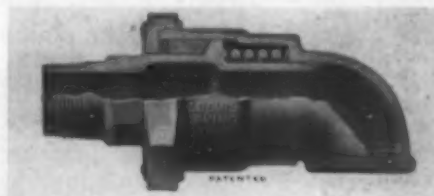


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under dry conditions. If not, it is unquestionably poor, but if it does have a high dielectric strength it may still be a poor insulator. A much more important point is its dielectric strength under high humidity conditions, because in a large portion of our country insulation is often subjected for considerable periods of time to high humidities.

Again, except for tubular forms, most phenolic laminated is not used in such a way as to exert electrical stresses perpendicular to the laminations. Instead, various terminals or contacts are inserted in holes drilled or punched in the insulating sheet so that stresses parallel with the laminations are the most important. Even in such cases flashover on the surface usually occurs before internal breakdown.

*Resistivity and Insulation Resistance.* In a similar manner the volume resistivity (resistance per unit volume) of a sheet of insulation measured perpendicular to the laminations is generally of little practical import. It is the insulation resistance (combined volume and surface, parallel with the laminations), particularly under high humidity condition, that is a real criterion of a high resistant insulator.

*Power Factor, Dielectric Constant and Dielectric Loss Factor.* The term "power factor" as applied to electrical insulation was little known outside of the research laboratory 10 years ago. Today no progressive manufacturer of phenolic laminated would consider being without accurate power factor measuring equipment to assist in developing and controlling this characteristic in his product. Likewise most of the larger users of electrical insulation such as the radio, power and telephone companies use such equipment to test the insulation they buy.

Power factor may be said to be the ratio of the power lost in an insulating material to the product of the impressed voltage by the current passing through the insulator. This very small current through the insulator is proportional to the dielectric constant of the material. The capacitance of an insulator is its ability to absorb an electric charge. The dielectric constant of the insulator may be considered as the ratio of its capacitance while acting as the dielectric in a condenser to the capacitance of air acting as the dielectric in the same condenser.

The electrical energy lost in the insulator appears in the form of heat and may be shown to be proportional to the product of the power factor by the dielectric constant. This product is known as the dielectric loss factor and is an inherent characteristic of the particular insulation used. Both the power factor and dielectric constant of an insulator vary, however, according to the frequency at which measured. These properties may either increase or decrease with an increase in frequency or change in an apparently irrational manner with frequency.

In many insulating materials, including phenolic laminated, the amount of energy lost in the insulation is proportional to the frequency of alternation. That is to say, since a certain amount of electrical energy is



converted to heat at each reversal of charge, the greater the number of cycles per second the greater will be the total loss of energy. It has also been found that the energy loss varies approximately as the square of the impressed voltage. The product of the frequency by the square of the voltage is a function of the circuit and not of the insulator and might be called the "circuit loss factor" as opposed to the "dielectric loss factor" previously described.

From this discussion it may be readily seen why the use of higher frequencies and higher voltages and particularly the two combined make it imperative to produce insulation of lower and more uniformly controlled dielectric loss factor.

*Effect of High Humidities on Electrical Properties.* Electrical properties of an insulator measured under dry conditions cannot be used as a safe indication of the value of the insulator under ordinary operating conditions. For example, dry paper is one of the best electrical insulators; when wet it is very poor. Experiments have shown that insulators with a cellulose base such as phenolic laminated show marked decrease in electrical properties at relative humidities over 70 to 75 per cent.

In almost every city in the United States, excepting perhaps Denver and Phoenix, there are many periods of 48 hours or longer during the year when the outdoor humidity exceeds 75 per cent. The indoor temperature generally being higher reduces the relative indoor humidity below this figure. However, during the summer months the relative humidity both indoors and out is higher than 75 per cent for long periods in the southern half of the United States and in the coast regions, and and at times even in the northernmost localities.

The moisture absorption of a sample of phenolic laminated when immersed in water is an indication of how readily it will take up moisture under high humidity conditions although the two are not necessarily linearly related. For convenience measurements of electric properties of phenolic laminated samples after immersion in water for definite periods are made as a guide to their action under high humidity.

The principal manufacturers of phenolic laminated have developed certain grades of sheet materials suitable for electrical applications exposed to relatively high humidities. The paper base grade of this type is known as Class XXX and the cloth base as Class LE and these are held to definite standards of dielectric losses and moisture absorption. Other grades of phenolic laminated have been developed for less stringent electrical applications and various mechanical applications. The National Electrical Manufacturer's Association has established standards of quality for both electrical and physical properties of these grades.<sup>1</sup>

*Typical Applications.* Some of the typical applications for phenolic laminated in the electrical industry are given on the following page as an idea of the scope:

<sup>1</sup> Copies of the NEMA Laminated Phenolic Products Standards may be obtained from the National Electrical Manufacturers' Association, New York, N. Y. for a nominal charge.



*Designed by Paul Moeninger*

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## Mold or Platen Temperatures

Mold or Platen temperatures are of vital importance in plastic material molding.

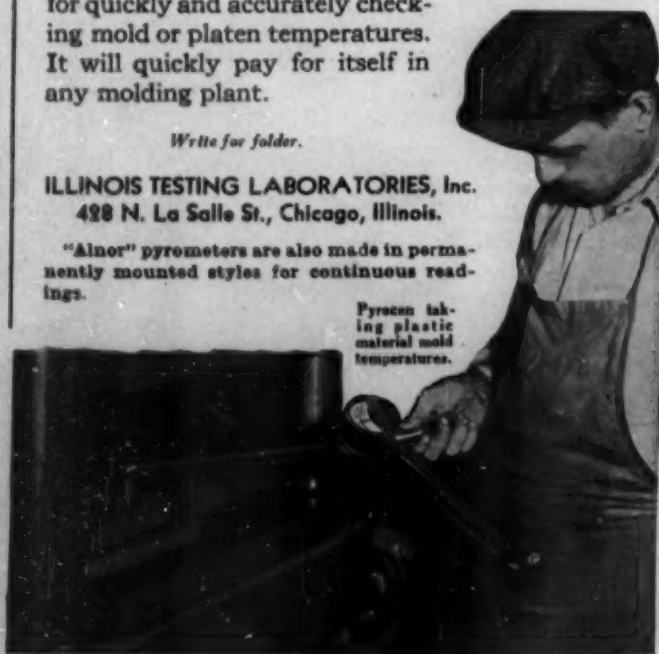
The "Alnor" self-contained portable Pyrocon pictured below is a moderately priced pyrometer for quickly and accurately checking mold or platen temperatures. It will quickly pay for itself in any molding plant.

*Write for folder.*

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"Alnor" pyrometers are also made in permanently mounted styles for continuous readings.

Pyrocon taking plastic material mold temperatures.



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Control Apparatus	Switch bars Switch handles Switch insulation
Motors	Terminal blocks Brush holders and supporters Bases and supports
Testing Instruments	Panels Cases Small insulating parts Bushings

*Limitations of Phenolic Laminated.* While the foregoing list of applications gives some idea of the wide field of use for phenolic laminated it should be recognized that it is not a universal panacea. Since it contains a certain proportion of cellulosic material phenolic laminated is unsuited for severe electrical applications where continuously exposed to water or steam or practically 100% humidity. While phenolic laminated is a good heat insulator it will usually not stand continuous temperature over 115°-125° C. and its electrical properties suffer some impairment under these high temperatures. It is also unsuitable for applications where the surface may be exposed to repeated severe arcing due to eventual formation of a conducting carbon path.

*Points to Be Considered in Design of Electrical Apparatus with Phenolic Laminated Insulation.* One of the fundamental principles of good design is that the design must suit the materials to be used. This applies fully as much to electrical insulation as to mechanical structures. Allowance must be made for an adequate factor of safety. The designer should acquaint himself with both electrical and mechanical properties of the insulating material. Only too often is the design of a piece of electrical equipment completed and perhaps some parts built and then the insulation thought of, with the result that there may not be enough space for proper insulation.

Realizing that phenolic laminated is a thermal as well as electrical insulator, provision must be made for adequate dissipation of heat, particularly under high voltage and high frequency conditions.



The manufacturers have developed a large range of standard sizes and grades suitable for a wide variety of applications. Wherever possible the design should call for standard sizes and grades of material to insure simplification, speed of delivery and low cost. If a special material in either size or quality is really needed then the user should expect to pay a premium over cost of standard material.

With the proper design made and proper type of material chosen, the user should make sure that the supplier has adequate manufacturing equipment and testing facilities to insure control of electrical and physical properties of the product and will preferably buy on specification, making inspection tests on a sufficient percentage of the material received to see that it meets his specification.

Here again in the matter of specification the user should specify carefully his allowable tolerances on properties and dimensions, following standards wherever possible and laying emphasis on those points which are critical, but not insisting upon properties or close tolerances where they are not needed.

### RESIN IMPREGNATION OF WOOD

(Continued from page 40) able finish is desired—a second application of the material is made, resulting in a transparent finish which brings out beautifully the natural grain of the wood. This second application remains on the surface because it is actually fused to the previously impregnated pores which terminate at the surface, and a firm body anchorage is secured. Thus, a remarkably hard finish is produced, offering extraordinary resistance to scratching and abrasion. The coated product acquires marked chemical inertness. Its very nature permits sanding and polishing operations to be performed without in any way impairing its luster and appearance. The thickness of the film is very apparent.

The impregnated wood exhibits its moisture resistance, by the fact that it does not swell, warp or in any way become distorted when subjected to moderate moisture changes. However, when the second (coating) process is applied, the moisture content is reduced to a negligible quantity and the resistance to water is so great that six weeks are required for the doubly processed wood to assume a normal moisture content (8%) when completely submerged in water. It, therefore, becomes evident that if wood so treated is subjected to alternate humid and dry conditions, the mechanical resistance of the wood is greatly increased by a low moisture content.

The Temp-Urd Wood process is now being used commercially by several leading sporting goods manufacturers in the processing of baseball-bats, golf club heads, tennis rackets, polo balls and mallets, fishing rods and lures. The process is now under test with

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several leading aircraft manufacturers in the treatment of wood propellers, braces and aircraft flooring.

Other manufacturers are testing the process in shuttles, bobbins, closet seats, musical instruments, patterns and handles of all sorts. Material treated is not limited to wood, but paper, paper pulp and plaster of paris may be similarly treated.

## **DRESSERWARE DESIGN WORTH WATCHING**

(Continued from page 27) field must approach. Plastic dresserware is sold largely through two channels. The first consists mainly of credit jewelry, credit furnishings and chain store organization where garishness, gaudiness and "flash" are inclined to predominate over the more conservative and admittedly more delightful designs which find their greatest outlet through the second important channel—the department stores.

Yet the essential thing is not the way in which results are finally achieved, but rather the opportunities which the materials themselves offer to the designer and the manufacturer in his particular field. If he serves a more discriminating field, let him study the materials and recognize their availability, even their superiority, for better treatment.

What then are these elements of availability? First and foremost is the infinite variety of effects possible when plastics are used, particularly in the case of the pyroxylin and acetates. Every shade of color, from white and ivory through the fine pastels and deeper shades to ebony and dull blacks, is available. Furthermore, an unusually large and constantly growing number of configurations, mottles, plaids, laminations, etc., are available either as stock patterns or as private patterns developed on special order by the cellulose nitrate and acetate producers. Thus the designer is endowed with a rich palette. His danger lies not in limitations but rather in the possibility of being led to excesses by his over-rich material.

Next in line comes the infinite number of ways which have been developed for working these materials. They may be chased, engraved, embossed, inlaid, carved and plated. Any of these, and many other processes, may be combined. Here again, ornateness rather than simplicity is the dangerous element.

Finally, we find one additional element of possibility for the designer, combination with other materials. For these plastics combine readily with wood, metal, glass, mirrors and other more commonly used materials. This type of combination is practical both from design and effect standpoints, where limitations are only those of the designer's imagination, and from a manufacturing standpoint, where the ease of working thermoplastics makes fabricating a simple and comparatively inexpensive series of processes.

Blessed, then, with materials that give the manufacturer every possible opportunity, how shall he proceed to adapt these to his purposes. It is not necessary



to invest in large and expensive producing equipment. On the contrary, it is possible to produce test runs at a minimum of cost and with no additional plant investment and to follow up successful tests with regular production which utilizes much of the equipment he may already have for working metals or woods.

Many of the more prominent material manufacturers in the field maintain large research and development staffs. They stand ready and willing to lend every assistance to those interested in planning new effects both for beauty and economy of manufacture.

In making samples or test runs, some of these firms and many others among the fabricating companies are always available with their fabricating equipment. In such instances, they cannot only produce model or sample merchandise at reasonable cost but can also work out the actual or probable production costs that may be experienced when mass production is begun. Manufacturers have the alternative of selecting a firm which is not directly in their field of business and which, consequently, will be moved by no competitive considerations, or of choosing one which is already working in their industry or related fields, in which case the competitive consideration will probably be counterbalanced by the fabricator's desire to develop new outlets for his experience in this particular field.

Lastly, after models have achieved acceptance among buyers, the sponsor of the new design will be confronted with the choice of continuing to have others fabricate or of setting up his own fabricating apparatus. Here he must be governed almost entirely by conditions affecting his own set-up. If he has been previously manufacturing in the field, using other materials, he will probably find a partial or total change-over easy of accomplishment through the addition of some simple equipment. In such an event, trained help is available or workers can be trained by the experts of the material suppliers or fabricators.

On the other hand, the manufacturer may decide to continue to have fabrication done, in whole or part, by others. If so, he will find himself in a highly developed field where competition has a tendency to keep costs down and production efficient.

Thus, whatever the product, if plastics are desirable because of their beauty and merchandising advantages, they are likewise adaptable because of the set-up of the industry which produces and fabricates these materials. A number of methods are available for keeping costs down while the prices obtained for the merchandise will depend solely upon its excellence of style and design and the potentialities of the market. In short, if profits are to be achieved at all in your field, one of the best roads to such profits is that offered by the versatile, easily worked thermoplastics.

Let the designer learn, from a study of dresserware, the elements of the plastic art and he will have traversed a good half of the road toward successful production of style merchandise. All photos, courtesy of the Celluloid Corporation.

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